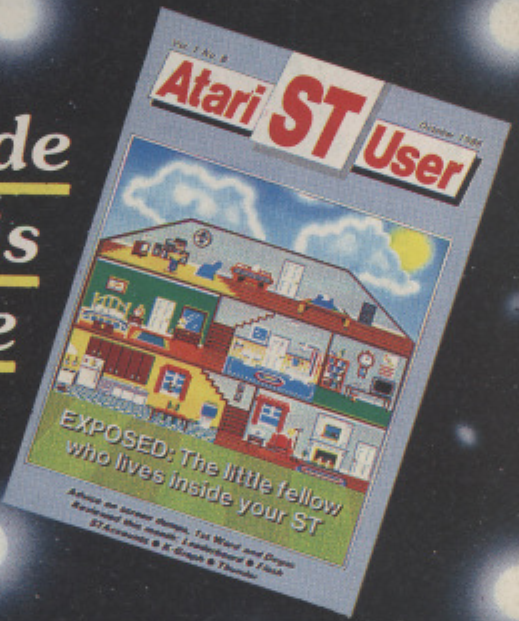
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ATARI USER

Vol. 2 No. 6 October 1986 £1

Inside this issue





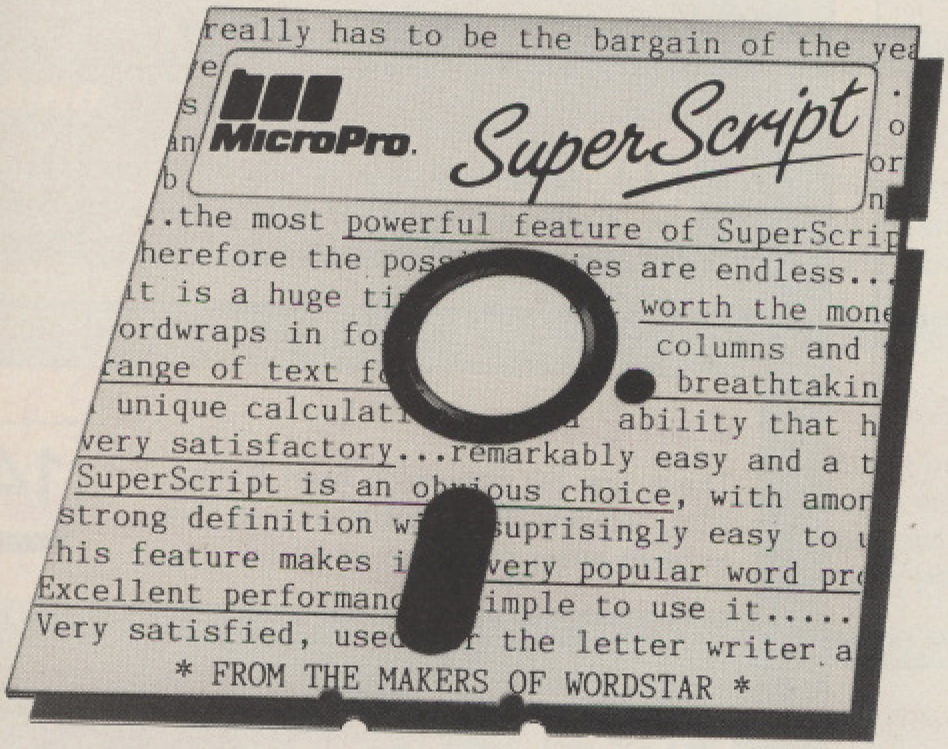
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Vol. 2 No. 6 October 1986

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Telecom Gold: **72:MAG001**
Telex: **265871 MONREF G**
Quoting Ref. 72:MAG001
Prestel Mailbox: **614568383**

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

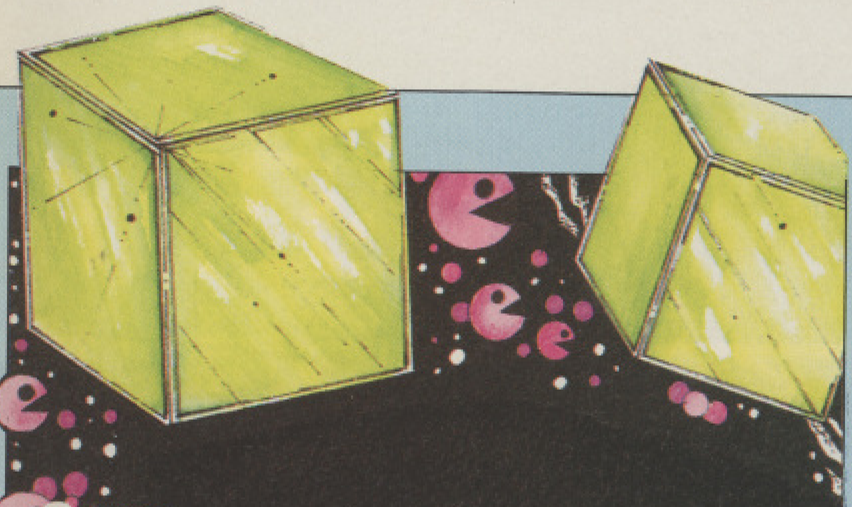
ABC 33,573 January-June, 1986

Subscription rates for
12 issues, post free:
£12 – UK
£15 – Europe
£30 – Overseas (Airmail)

News trade distribution:
Europress Sales and Distribution Limited, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.



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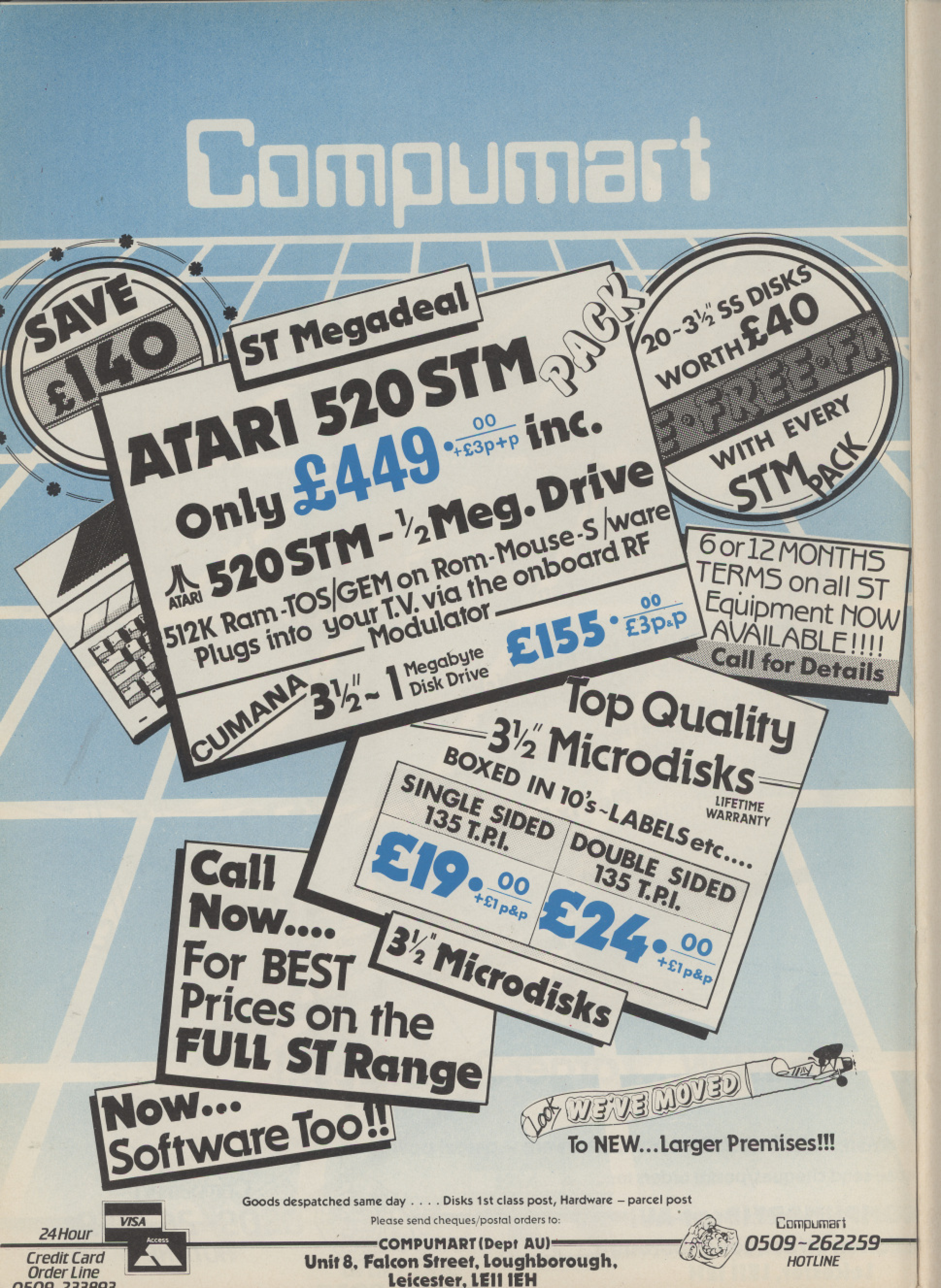
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SUPER SOUND CHIP ON WAY

ATARI is on the verge of launching a revolutionary sound synthesiser chip for the ST.

Leonard Tramiel, son of chairman Jack Tramiel and himself a leading company boffin, revealed this to Atari writer Andrew Bennett.

The early development of the chip – known as the Amy – began in the pre-Tramiel days and was the first end user project started after the 800XL.

"They set out to develop a custom chip of great complexity but they had limited resources and poor development tools," explained Leonard Tramiel.

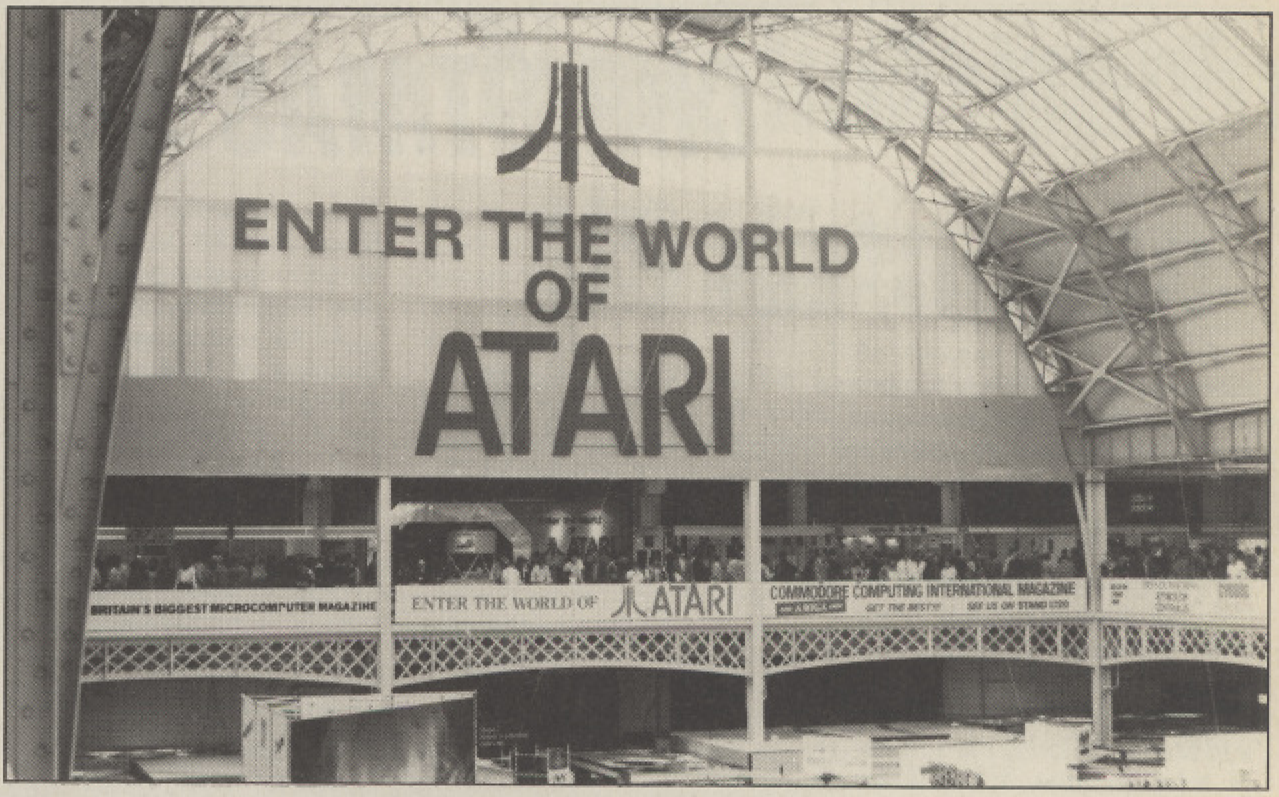
"Although the architecture was brilliant the early version of the chip didn't work.

"When we took over Atari we saw Amy as an excellent potential product. Now we have sold the design to a company that I cannot name just yet and they are hoping to have the final working chips ready soon".

ST software

SEVEN new software titles for the Atari ST series have been announced by Microdeal.

They include four games – Shuttle II, Trivia Challenge, Electronic Pool and Pinball Factory – multi-user bulletin board system BBS Version 2, wages package Payroll, and mailout system Mighty Mail.



Surprise launches at the show

WITHOUT advance warning, Atari launched two new machines and a breakthrough graphics chip on the second day of the PCW Show.

Visitors to "The World of Atari" corporate stand at Olympia were surprised to see the latest additions to the ST range – the 2080STF and 4160STF – suddenly appear in a glass display case.

At the same time, officials began to demonstrate the Blit enhancer which increases graphics speed sixfold.

Even the Atari press office appeared to have been caught napping, having to prepare information sheets on the spot after the event.

The two new machines have the increased memory capacity of two megabytes and four megabytes respectively.

Both are totally ST compatible and feature an in-built one megabyte floppy disc drive.

According to Max Bambridge, general manager of Atari UK, the 2080STF and 4160STF will find a ready market among specialists working in "RAM disc operations, artificial intelligence applications and high level programming such as Lisp".

Price of the two megabyte machine is £1,149 with monochrome monitor and £1,349 for the colour model. The top of the range four megabyte ST will carry a price tag of £1,459 monochrome and £1,659 colour.

Both the 1040STF and the 4160STF will go on sale in the UK in November.

The same month will see the Blit chip go on sale for £60 as an upgrade for the complete ST range.

It will need to be fitted by Atari authorised dealers and independent Atari service centres.

Comments Les Player, Atari's technical manager: "It's very simple in operation. The chip just moves memory around very fast without the need to use the 68000 CPU. This means that animation sequences will run much faster, without impacting normal processing power".

More 8 bit games

NINE all-action games for Atari 8 bit owners are being released by Red Rat Software this autumn.

Just out are Freaky Factory and Rocket Repairman, both £4.99 on disc and £2.99 on tape, War-Copter and Astro Droid, £9.95 on disc and £7.95 on tape.

To come this month are Demolition Derby and Domain of the Undead, both £9.95 on disc and £7.95 on tape, and Treasure Island and Dragon's Breath, £4.99 disc and £2.99 tape.

Planned for release in November is Escape from Planet X which will cost £4.99 on disc and £2.99 on tape.

Red Rat will be releasing a version of its earlier success Screaming Wings for the ST series in early December, price £19.95 on disc.

ALL program listings in *Atari User* are now available for free downloading on MicroLink, the UK's fastest growing electronic mail service. They join hundreds of programs already available in the telesoftware section, one of the most popular areas of MicroLink.

In brief

ATARI has appointed DDT Maintenance as a preferred third party contract maintenance source for its 1040STF and 520STM machines.

The firm has a network of more than 100 engineers backed by 12 service centres and two repair centres covering the UK and Eire.

★ ★ ★

INTERACTIVE fiction specialist Infocom is releasing two new titles for Atari machines this autumn.

Leather Goddesses of Phobos and Moonmist bring the number of Infocom titles available for Atari 8-bit and ST to 22.

★ ★ ★

A NEW business program released by CashLink Software for the ST series is Hotelier, designed for small hotels of up to 100 rooms.

It offers a front office system handling all guest charges and transactions, as well as a full back office consisting of sales, purchase and nominal ledgers.

Hotelier also provides a word processor and menu writing facility. Price: £1,150.

★ ★ ★

A TRIO of new products for the Atari ST has been launched by systems software house Metacomco.

Cambridge Lisp is an interpreter with integral compiler, said to be the first fully-featured expert systems development environment for the ST.

It opens up applications such as robotics, natural language interfaces and expert systems. Price: £149.95.

Also new for programmers from Metacomco are the BCPL compiler at £99.95 and Metacomco Make utility, £49.95.

★ ★ ★

A PERIPHERAL which offers true 80 columns for Atari 8 bit machines was on display at the PCW Show.

The XEP-80 to be released any day now is one of a string of new products reported to be in the pipeline for the 130XE and 800XL.

CHRISTMAS SHOW RUSH

With two months still to go, exhibitors are rushing to book space at the Atari Christmas Show.

They don't want to risk getting left out of a repeat success story following the enormous impact of the first Atari Computer Show in London last March.

A total of 15,000 visitors turned up then and that massive demonstration of support effectively re-established Atari as a market leader in the UK computer industry.

The spectacular Atari showcase returns to London on Friday, Saturday and Sunday, November 28 to 30, at the centrally located New Horticultural Hall, Westminster.

All the leading producers and suppliers of Atari add-ons and software will again be represented, occupying well over 100 stands in the spacious 20,000 sq ft exhibition hall.

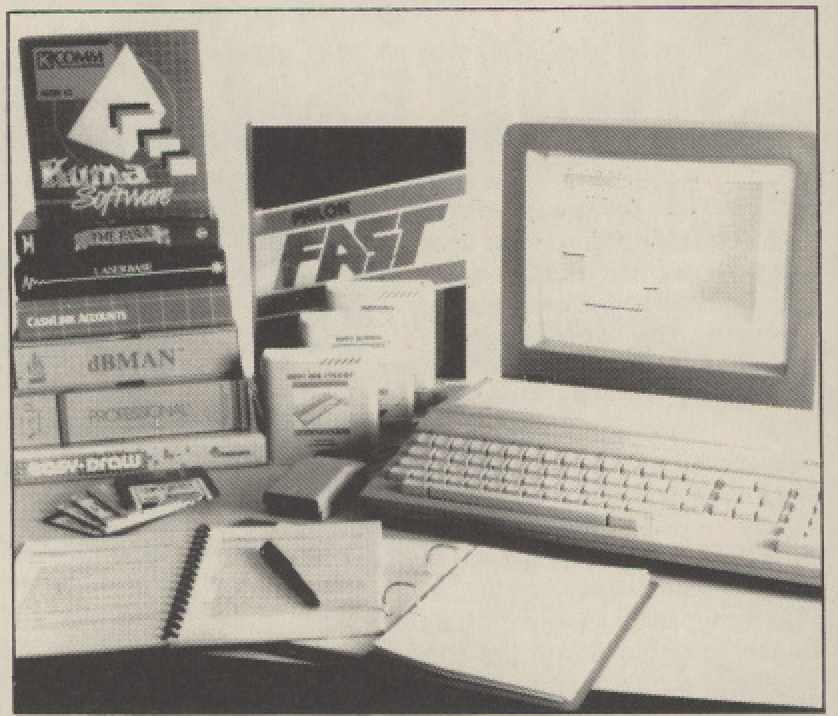
Big names like Software Express, Twillstar, CDS, Microdeal, and Advanced Systems & Techniques will be there – ensuring plenty of interest for 8-bit and 16-bit enthusiasts alike.

New programs and add-ons for the ST series and 8 bit range will be launched at the show, and there will be opportunities to question the UK's leading experts on Atari computers.

The event promises to fulfil all the wishes of pre-Christmas shoppers waiting to fill their stockings with the latest Atari hardware and software.

It opens from 10am to 6pm Friday and Saturday, November 28 and 29, and 10am to 4pm Sunday, November 30.

There is £1 off the price of tickets ordered in advance using the coupon on Page 13 of this issue of *Atari User*.



Some of the latest software packages available for the Atari ST series are pictured with a 1040STF whose screen shows the GEM standard operating system TOS.

More power on tap

DESCRIBED as a "major advance in raw processing power availability", K-Max is a new add-on from Kuma Computers which plugs into the rom port of the Atari ST.

Inside K-Max is an interface board and a dual processor board which can contain two Inmos T414 transputers and two blocks of 256k of ram.

Each T414 is a 7.5 mips (million instructions per second) 32 bit Risc parallel processor.

Parallel means they can easily be connected by simply adding their Mips together – two 7.5 Mips processors having the potential of 15 mips.

K-Max is controlled via the ST keyboard and screen using specially developed software.

Kuma has supplied a cross-assembler and editor as the main tool for controlling and programming the T414 transputers.

Additional functions include a machine monitor, debugger and disassembler – the ST assembles T414 code at 50,000 lines a minute, says Kuma. K-Max costs from £1,450.

Artwork utility

ALL kinds of artwork spring to life on the Atari ST with Make it Move a new package from Californian software house Avila Associates.

It comprises a set of utilities designed to enhance pictures and present them in a variety of dynamic ways by using such features as moving objects, video transitions, zooms and fades. Price: $49.95.

8 bit speed boost

OWNERS of Atari 8-bit machines can load and run discs at twice normal speed and read/write up to five times faster with a new drive enhancement from Innovated Software.

The IS Plate device for the Atari 1050 disc drive has 16k of on board ram and is compatible with all operating systems on the market.

Sector skew is not required to obtain hi-speed as with US doublers. Other features are slow down, fast write, fast read, drive write lock, skew on/off, and fast formatting.

Available exclusively from Chips Computer Centre, West Worthing, the 1050 IS Plate disc drive enhancement costs £99.95.

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                                               %
%         # ## #                                %
%         # ## #          Mnematics             %
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%       ##  ##  ##           Sysop:             %
%      ##   ##   ##     Oliver Chesler          %
%      ##   ##   ##          ID#:               %
%     ##    ##    ##         6244               %
%  ###      ##      ###                         %
%                                               %
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```

New link-up to US database

MicroLink has achieved a world first with a new electronic link across the Atlantic. It allows subscribers to have instant access to a giant American database – including a dynamic section especially for Atari users.

And the cost will be approximately half that of a conventional transatlantic call.

The breakthrough has come about as a result of a deal struck between MicroLink, the UK's fastest growing Email service, and New York based Mnematics.

Gateway

With the help of its American partner, MicroLink has set up a complex electronic gateway which enables the exchange of messages between micros on opposite sides of the Atlantic.

The computer link opens up a host of new services to MicroLink subscribers.

Included among some 40 special interest groups is one specifically for Atari users which provides all the latest information on what's available for the machines States-side.

There's an extensive Atari database crammed with information, along with message and chat facilities.

But Mnematics isn't just about computers. Special interest groups catered for include doctors, dentists, estate agents, lawyers and writers, and there is a micro-conferencing facility.

Instant

Other services include global news round-the-clock from the Associated Press and instant information from Dow Jones, the New York stock exchange monitor.

"We are delighted that we are able to offer this first", says Derek Meakin, head of MicroLink. "It's going to transform the way we communicate with our cousins over in the States".

Now the technicians at Mnematics are working on a reverse link to allow micro users in the USA to share all the facilities offered by MicroLink.

```
Atari Message £136
Posted : 08/22/86
From   : PAUL via MicroLink, £66
To     : ALL
Subject: MicroLink Gateway

Greetings to all fellow Atari users! My name is Paul
Camilleri:& as you see I'm calling from London via
MicroLink. I run a computer consultancy called Atlas
Computer Supplies using STs to run s/w for
electro-mechanical engineering industries in the UK. I hope
to be a regular caller to the Mnematics Atari SIG and an
interesting one it looks too! See you all soon.

Regards
Paul C
ACS


Atari Message £ 137
Posted : 08/23/86
From   : Oliver Chesler, £6244
To     : Paul via MicroLink, £66
Subject: Welcome

Paul,
Welcome to SIG Atari, hope to see you here a lot.

Oliver Chesler
Sysop
```

One of the earliest exchanges on the new MicroLink/Mnematics system involved Atari user Paul Camilleri of London and SIG Atari sysop Oliver Chesler.

More ST packages

TWO powerful business packages have been released for the Atari ST by Execon.

Invoicing/Order Processing module includes order processing, price list and journal and has the facility to allocate either the complete invoice or individual entries to three main areas – such as sales representative, sales area and department – as required.

This can be used for many purposes in accounts, sales analysis and reporting, for example slow paying and bad debt report per salesman. Price: £155.

Execon Accounts includes sales, purchase and nominal ledgers, trial balance, forecasting and graphics.

There is also an extensive search and reporting facility, and it is possible to use nominal account numbers to enhance reporting. Price: £250.

DEALING WITH DATA

A PACKAGE designed to handle multi-dimensional data efficiently is soon to be released by Modula-2 Software for the Atari ST. GridFile/ST provides full access functions for the storage and retrieval of complex data structures, and is implemented as a set of library modules.

A demonstrator program showing the use of GridFile for implementing a simple database of names and telephone numbers is included.

The price is expected to be around £50.

Making music

MAKING music with your Atari 8 bit micro becomes possible with two new products from 2 Bit Systems.

Midi Master is a Midi interface featuring an eight track real/step time sequencer, a Casio CZ voice editor for editing and storing voices on disc or cassette, and a Yamaha DX100/21 series voice editor. It has a music player program allowing users to play Music Composer or AMS song files via Midi. Price: £27.50.

Percussion Master is a professional quality drumkit featuring nine sampled drum sounds, three drum polyphonic, a facility to load the user's own drum samples, and pull down windows.

... and composing

LATEST release in the K series from Kuma Computers for the Atari ST is K-Minstrel, a music composer package operating under GEM.

It has 3,200 chords in four channel mode, with crescendos, accelerandos, diminuendos and relantandos to add expression to the user's compositions. The Midi interface allows music to be played on 4, 8, 12 or 16 channels. There is a full range of accidentals.

All or selected parts of a tune may be played, and several example tunes are included on the disc, which costs £29.95.

World of Atari focus was on the ST

THE Personal Computer World Show has become the industry's main forum for demonstrating the latest technology and showing off its new ideas. It can not have escaped anyone's notice that Atari planned to dominate the 1986 Show at Olympia, and dominate it it did.

On the lower floor you could see the latest offerings from Amstrad, Sinclair, Acorn and the like, while upstairs Atari had taken over an entire hall with its World of Atari show-within-a-show. But what was there to show for this massive amount of floor space?

Well the single most obvious fact about the Atari stand was that it was predominantly ST-oriented. There were a few 8 bit machines about – mainly on the third-party stands – but Atari seemed far more interested in pushing the ST.

Indeed, the only specially interesting development for the XE range was the XEP-80 80 column box. This seemed a somewhat tacky unit, interfacing as it did through the second joystick port. You might have expected Atari to use the parallel bus for such a device, but instead they used the more awkward joystick option. The display itself was good, but it required a special driver to be booted from disc in order to run.

On the ST side, though, the story was quite different. Atari was showing three major additions to the range. The much predicted 2mb 2080 ST was on display in a glass case, as was the even larger 4 mb 4160 ST. These new machines – to be released in four to six weeks – were probably far less interesting than the new blitter chip which was running on an existing 1040.

It seems this will be a straightforward modification for existing owners, consisting of six new rom chips and the blitter itself, with the price including fitting by your dealer. Apparently the chip interfaces to the operating system by re-vectoring the Line A interface, thus speeding up almost every facet of the machine, including the rather slow GEM text displays.

The demo running on the stand showed a whole flock of birds flying over a coastline landscape, and the blitter version ran three to four times faster than the "straight" 1040. An Atari representative said that the blitter was in final beta-test now, and should be available early in the New Year.

Atari is now awaiting delivery of the revised version of Basic, but from what I've heard so far you might just as well buy a copy of Computer Concepts' Fast ST Basic – a truly remarkable feat of programming with benchmark times at least three times faster than the IBM AT, and an amazing eight times faster than the BBC Micro.

As it also fully supports the GEM environment, I feel that this could well be the Basic of the future as far as the ST is concerned.

The future of the ST is bright indeed if the quantity and quality of ST software support continues at the pace we saw at the show. Notable products included MirrorSoft's Art Director – a superb graphic art package which gives more features and facilities than ever before.

Kuma and Microdeal had their latest offerings on display, and the number of accounts, speadsheet, database, comms and other business packages available indicates that the market is treating the ST as a serious and useful business tool, not just a very pretty graphics machine as certain other 68000 based machines seem to be becoming.

All in all a very encouraging show, with Atari moving ahead in leaps and bounds with the ST range. Nor are the 8 bit machines being abandoned, although Atari does seem to be leaving that area mainly in the capable hands of the third-party suppliers while it concentrates on pushing back the frontiers of 16 bit technology.

With the 2080 and 4160, the blitter and the TT plug-in co-processor board on the horizon, there has never been a better time to move into the world of 16 bit computers, and there has never been a better machine to do so with than the ST.

André Willey

An event NOT to be missed!

Atari Christmas Show

Royal Horticultural Hall Westminster, London SW1

Friday November 28 10am-6pm
Saturday November 29 10am-6pm
Sunday November 30 10am-4pm



The first ever Atari Show last spring was an outstanding success. From all over Britain Atari enthusiasts flocked to London to find out all they could about their favourite machine.

Soon the record-breaking Atari Show will be back – with three days devoted to the exciting developments in this expanding market. Make a note in your diary NOW to make sure you don't miss this great Christmas extravaganza!

- ★ All the latest software from publishers in both the UK and USA
- ★ New hardware releases from Atari and other major companies
- ★ Experts from Atari User and Atari ST User to answer your questions
- ★ Experience the fascinating world of computer communications
- ★ Everything on show from stocking fillers to complete Atari systems

They'll all be there! Games consoles, 8 bit machines . . . the entire ST range!

Whether you're a new user or a seasoned addict, you'll find the show overflowing with ideas to help you expand your computing horizons!

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☐ Under-16s tickets at £1 (save £1) .... £ ______
TOTAL £ ______

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Royal Horticultural Hall, Westminster, London SW1

November 28-30, 1986

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- ★ Prizes will go to the senders of the first 50 correct entries opened on October 31.

THE QUESTIONS

1. Which game, written by American programmer Russ Wetmore, was the most successful ever written for the Atari?
2. What is the maximum number of colours the Atari 8 bit computers can display at any one time?
3. What girl's name was used to identify the Atari computer during its development over 5 years ago? Clue: it begins with a 'C'.
4. Which game was English Software's first machine code program for the 16k Atari 400?
5. Name the author of the Atari version of Elektraglide.

Your answers

1 ______________________

2 ______________________

3 ______________________

4 ______________________

5 ______________________

NAME ______________________

ADDRESS ______________________

____

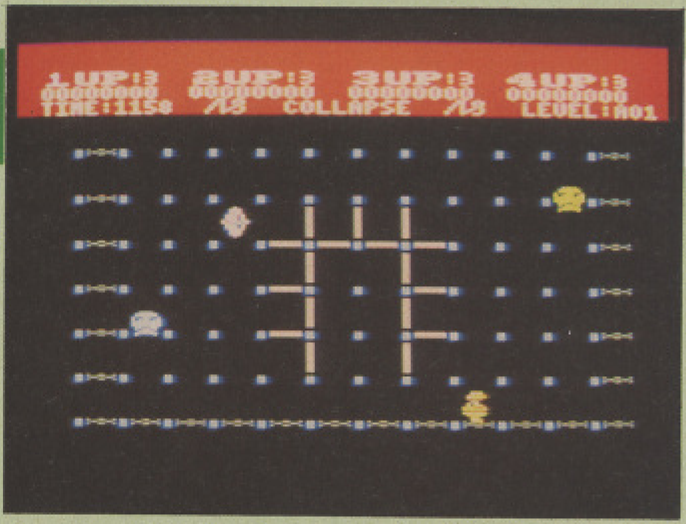
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Do you require cassette or disc? ______________

Very different...

Program: Collapse
Price: £1.99
Supplier: Firebird, Wellington House, Upper St. Martin's Lane, London WC2H 9DL. Tel: 01-379 6755



THIS is a most unusual game and one none too easy to describe.

In the centre of the screen is a collection of grey sticks, the objective being to turn them all blue.

When you've done that you activate a gizmo known as a Rotix, which has the effect of collapsing all the sticks on top of each other.

Mission completed, you move to a new screen with a different configuration of sticks and do it all over again. And again until you've completed all the screens.

As well as the grey sticks a number of bridges are spread around each screen. You use them to gain access to the sticks. However, because there are insufficient bridges to get you to all the sticks, you have to construct more bridges.

Carrying out all this construction work, and under your control, is a small roly-poly character called Zen which operates in two modes – magic and normal.

In normal mode, Zen is yellow and will move left, right and up (the only way down is by falling), turning any grey sticks blue on contact. A press of the fire button puts Zen into magic mode, when he turns red and can move left and right.

A press of the fire button creates a bridge in the required direction or, if next to a blue stick, sets a Rotix (a sort of whirling line) into motion.

Pulling back on the joystick while in magic mode releases a cloud of magic dust to freeze the aliens. Oh sorry, didn't I mention them?

Well, any of the several blobby aliens which float around the screen will get stuck on contact with the dust. Zen can pass over them in this state and collect extra points.

Contact with the aliens at any other time is harmful to Zen's health.

I also forgot to mention the flashing diamonds. These can be picked up for extra points. And there are bonus points for collapsing the blue stick matrix in one go. And one other small thing – there are 96 screens.

I really don't know what to make of Collapse. Top marks for originality unquestionably, but the graphics are only so-so and the abstract nature of the game doesn't generate excitement.

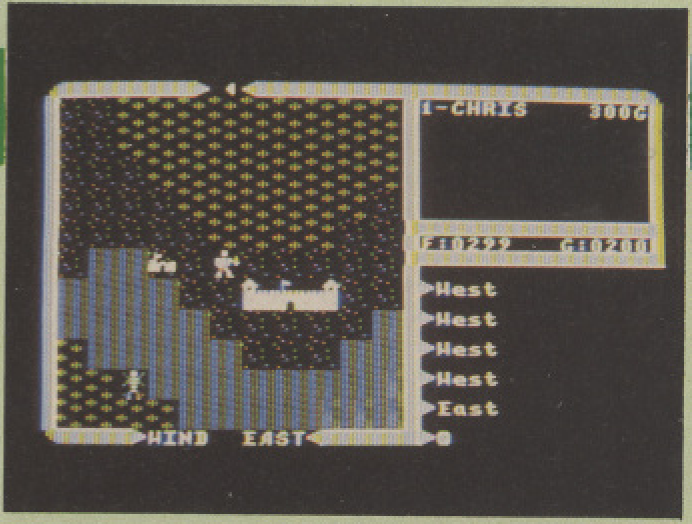
But credit where credit's due – Collapse IS different, and that must be good news for jaded players.

Douglas Wooller

Sound	5
Graphics	7
Playability	8
Value for money	8
Overall	7

Graphics plus

Program: Ultima IV
Price: £19.95
Supplier: US Gold, Unit 2 & 3, Holford Way, Holford, Birmingham B6 7AX. Tel: 021-356 3388



ULTIMA IV, the latest in the Ultima saga, is the tale of the land of Brittania after the fall of the Triad of Evil.

Lord British, the all powerful ruler has sent out a message to all the lands to find a person capable of completing the quest of the Avatar, and you have taken up the challenge.

The beginning is like a graphics adventure. You move between locations until you meet a gypsy woman in her caravan. She bids you to sit and you proceed to answer multi-choice questions about cards which she places on the table in pairs.

As you answer you build up your character which is represented on an abacus-like object. On your last choice the game starts.

You will be one of eight professions – mage, fighter, tinker, and so on – depending on how you answered the questions, and you find yourself outside the home town of your profession.

The display shows you as a single figure in the surrounding countryside. You cannot see beyond mountains or dense trees, which sometimes means that blocks of the display are left blank.

Movement is with the arrow keys and other commands like Attack are carried out by single key strokes.

I found that the most useful command was Talk. If you stand next to one of the town's inhabitants and hit T followed by a direction key – his replies will appear in the text window.

If you type Job he might say: "I search for the blue stone". Then if you type Stone he will tell what he can.

Do not lie to characters when they ask for a response as this reflects on your character and will do you no good later on. Some characters will join your party if pressed.

Magic is important in this game, but it is also rather tricky. The Book of Mystic Wisdom, which is included with the game gives details of the reagents required for spells, and clues as to their quantities.

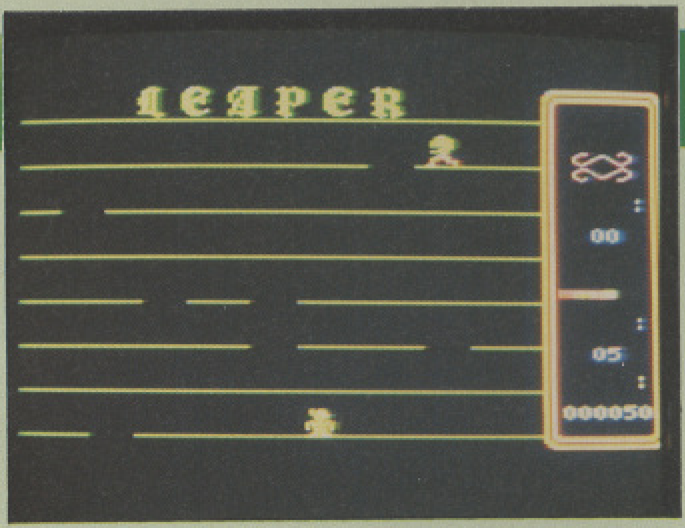
The whole game is, according to the advertising blurb, 16 times bigger than Ultima III.

With two discs, a book on the history of Brittania, the Book of Mystick Wisdom, and a full colour vinyl map of the land, it is good value. Ultima IV is an excellent game which deserves the attention of every keen adventurer.

Simon Marden

Sound	6
Graphics	7
Playability	9
Value for money	10
Overall	9

Simply boring?



Program: Leaper
Price: £2.99
Supplier: Bug Byte, Liberty House, 222 Regent Street, London W1R 7DB Tel: 01-439 0666

LEAPER is a delightfully simple game, which is more or less identical to Leggit from Imagine Software released a few years ago and no longer available.

Surprisingly, to load the game you need to type CLOAD followed by RUN.

You control a little green character, Leaper, who can move to the left and right as well as jump. The screen consists of six thin horizontal bars each with a narrow moving gap.

Your task is to reach the top of the screen by positioning yourself below a gap then leaping up on to the next level.

Unfortunately if a gap appears below you you fall down a level – and this happens with frustrating regularity.

You can run off the screen on one side and reappear on the other, which adds another dimension to the game. But you need to be careful as action can occur off screen and you could get killed.

Each jump costs you energy, a limited commodity. You also have to contend with the Gribblies which run along the various platforms.

They come in six different forms – Gub-Gubs, The Last VW, Cupid's Arrow, Mutant Hot Cross Buns, the Gyro-Biro and UFOs. Some move along the platforms at a leisurely pace while others really shoot along. Contact with any is fatal.

If and when you reach the top level you must jump up at a letter to illuminate it. You return to the bottom of the screen to face a greater number of adversaries. Your task is to illuminate six letters to spell the word Leaper.

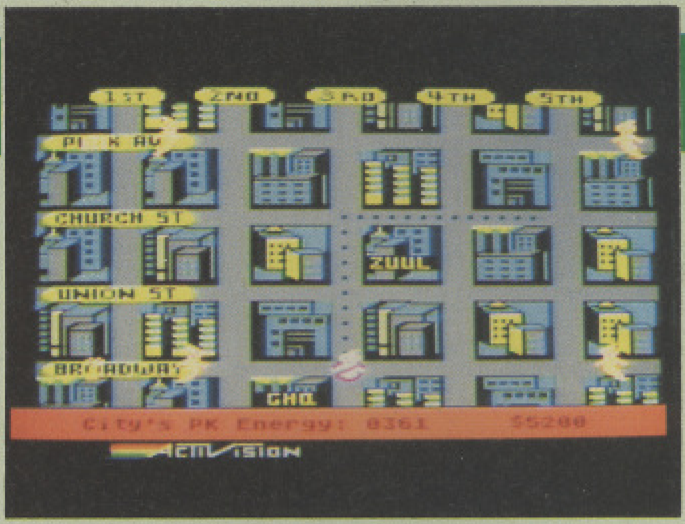
The concept is quite entertaining and in general well executed. Leaper and the other characters are well animated, colourful and humorous, but action does freeze for a split second when you jump.

The game is good value for money but its simplicity is its weakness. I suspect that the attraction may wear off after a few weeks because it lacks variety.

Mike Rowe

Sound	***5***
Graphics	***7***
Playability	***7***
Value for money	***7***
Overall	***6***

Worth the wait



Program: Ghostbusters
Price: £9.99 (cassette)
Supplier: Activision, 23 Pond Street, Hampstead, London NW3 2PN. Tel: 01-431 1101

PREPARE to be slimed! It's been a long wait for the enormously successful Ghostbusters game to reach the Atari range but at last the Slimers, Roamers and Marshmallow Man are here.

And what an excellent job Activision have made of the conversion.

New York has been invaded by ghoulies and ghosties hell-bent on reaching spook central, the Temple of Zuul. As owner of a Ghostbuster franchise you must catch these gooey extomorphs, earn pots of money and make it to the grand showdown on top of the temple.

You'll be greeted with a shout of "Ghostbusters!" followed by a fruity laugh (great speech synthesis).

When you finally manage to tear yourself away from the exuberant intro you buy your Ghostbuster vehicle and equipment.

You'll either be presented with a loan of $10,000 or, if you've played before and reached a certain level, an appropriate cash credit depending on your entered account number.

Then it's on to the streets to look for Slimers. The screen shows a map of the city, with the Zuul temple about centre screen.

Your position is marked by the famous Ghostbuster logo which has to be moved by the shortest route to a likely building (red flashing indicates Slimer presence) touching (and so freezing) any Roamers on the way.

The screen changes again to show an overhead view of your car cruising down the street. Any Roamers encountered can be sucked up provided you have a vacuum.

When you arrive at the infested site the screen shows the front view of the building. You manoeuvre your men to trap the floating Slimer using the handheld ionisers.

Every Slimer captured pushes up your credit rating. If you miscalculate your positioning, or let the two streams touch, you'll be slimed.

When a Marshmallow alert is sounded, the Roamers join up to form the dreaded Marshmallow Man. Drop a dollop of bait fast before he does much damage.

All the while, two moving creatures – the Gatekeeper and the Keymaster – are headed for the temple. When they meet there the game ends if you haven't earned sufficient credit. If you have, you can sneak in two Ghostbusters for the grand finale.

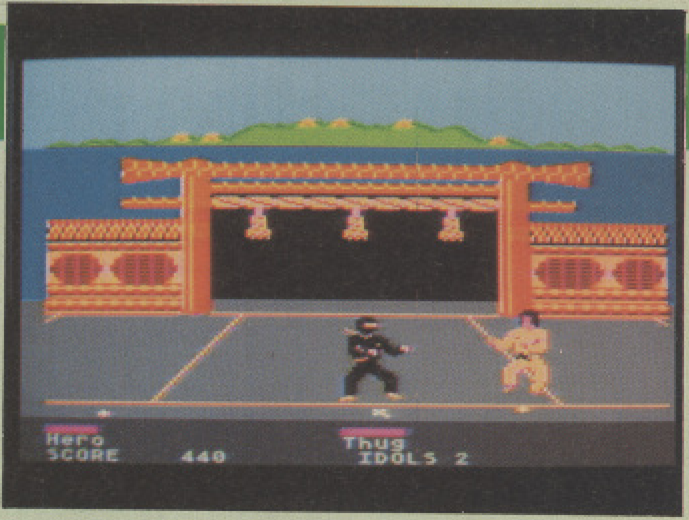
The graphics are very good, the music and speech synthesis excellent. Combine these with game play that is simple but great fun and you've got a winner.

Ghostbusters looks set to repeat its earlier conquests all over again.

Bob Chappell

Sound	***9***
Graphics	***8***
Playability	***9***
Value for money	***8***
Overall	***9***

Eastern bash away



Program: Ninja
Price: £1.99
Supplier: Mastertronic, 8-10 Paul Street, London EC2A 4JH. Tel: 01-377 6880

AH so Ninja! Punch-kick-grunt-duck-chop. Banzai! Enemy bite dust. Me likee.

So much for setting the Oriental atmosphere. I may not know much about Ninja-speak but what I do know is that this martial arts game is pretty good stuff.

This is a single-player only game in which you control an all-kicking, all-punching Ninja. Suitably clad in the traditional black garb of such fighters, you set off through five screens to conquer all foes.

As well as walking left and right, your bodily skills include high, medium and low height kicking and punching, all done very swiftly, very smoothly. The animation is extremely good.

In addition to iron fists and lightning footwork, you have other wheezes in your repertoire – a slashing Samurai sword, spinning death stars and throwing daggers.

The sword you carry with you on your shoulder at all times, and can easily fetch your opponent a swingeing blow with a quick flick of the joystick.

The stars and daggers may be found lying around in different locations and can be picked up by crouching beside them. Hurling one at an opponent may wreak fatal damage unless the opponent deflects it in time.

Unfortunately the enemy have similar weapons so you won't be the only one doing the hacking and hurling.

Also scattered around the area are small flashing idols which should be collected for extra points. Needless to say, these are always guarded by the enemy, who won't let you take them without a fight.

Moving off the screen either to the left or right causes the current picture to be replaced by the name of the area you are about to enter. The screen clears again to show you in your new location.

The animation is this game's best feature, though – smooth, natural and fast, easily up to the standard of far more expensive games.

Once you've forced all your opponents to their knees – actually, they crumple up like punctured concertinas – you move to the next level where tougher fighters are to be found.

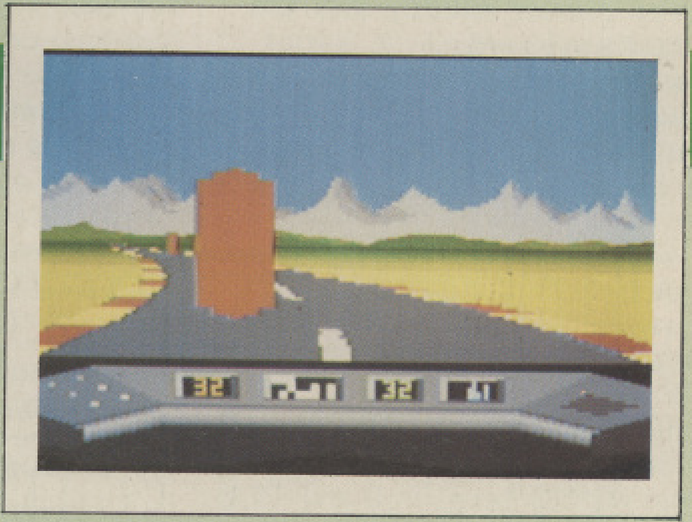
It may be because I was playing the game on an old 800 micro (the inlay says it is for 800XL and 130XE machines) but it wasn't all clear to me that I had actually moved up a level after defeating all foes – no level indication appears on the screen.

It's a very good martial arts game with first rate animation and sound. The sword, stars and dagger elements add an extra dimension to the fighting. For the low price, an unmissable bargain, grasshopper.

Bob Chappell

Sound	***8***
Graphics	***8***
Playability	***9***
Value for money	***10***
Overall	***9***

Good collection



Program: Smash Hits Volume 5
Price: £9.99 (cassette), £14.95 (disc)
Supplier: English Software, 1 North Parade, Parsonage Gardens, Manchester M60 1BX. Tel: 061-835 1358

ANOTHER in the series of compilations of earlier releases, this twin cassette or disc anthology features Chop Suey, Mediator, Elektraglide and Quasimodo.

Chop Suey is an impressive martial arts game enabling you to pit your Kung Fu skills against another player or the computer.

As well as being able to jump upwards and shuffle quickly to the left and right, each fighter can kick high, low or to the body, jab and somersault over the opponent.

Eleltraglide is a sort of Pole Position with tunnels. There are no other drivers to compete against. What you have to watch out for and avoid are giant spheres and cubes which come rushing out of the sky towards you.

A plane will also fly over, dropping large columns onto the track as added obstacles.

There are three courses and steering modes to choose from. The game plays very fast (the speed of the graphics will turn your hair white). As a result, it can be a bit on the difficult side but if you like a challenge and plenty of speed, you should enjoy this one.

Mediator is an unusual and tough mixture of multi-screen arcade action and problem solving.

Apart from the first, each screen offers something different and you can only progress by overcoming the hazards and solving the mysteries presented on each screen. A real challenge.

Finally, Quasimodo is a platforms and ladders type game offering three basic scenarios. Scene 1 has you throwing cannonballs down from the castle battlements at ladder-climbing archers

Scene 2 has you swinging from rope to rope in the bell tower. The final scene sets you scaling the castle wall, fighting off all comers.

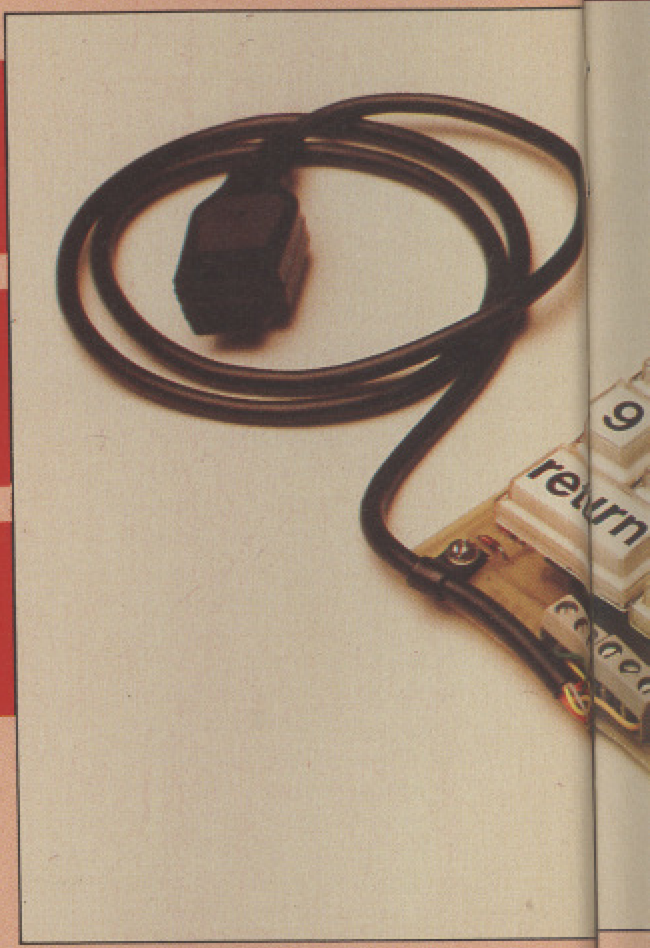
Quasimodo is graphically the weakest of the bunch, but still offers some good play.

This is probably the strongest compilation from English Software yet issued and provided you haven't got most of the games on it, Smash Hits Volume 5 is certainly a good buy.

Bob Chappell

Sound	***7***
Graphics	***8***
Playability	***8***
Value for money	***9***
Overall	***8***

Set yourself up with 16 extra keys



Part 5 of LEN GOLDING's series on using your Atari to control devices

THIS month's constructional project is a plug-in keypad which gives you up to 16 extra keys, and behaves almost exactly like the standard keyboard.

The version described works as a numeric keypad with its own Return key and single-touch cursor movement, but each key is fully programmable.

It works in a similar way to a joystick, by setting up patterns of high and low voltages on the four input signal pins (as described in the June 1986 issue of *Atari User*). The operating system reads this pattern 50 times a second, converts it into a decimal number between 0 and 15, and stores it in address 632 (for Port 1) or 633 (for Port 2).

Figure I shows the circuit for four extra keys, one to each line, and this is about the simplest worthwhile gadget you can build. You could make the keys extra large for disabled people, colour-code them for pre-readers, or set them up as function keys. You could label them "Yes", "No", "Don't know" and "Help" for a children's quiz, or "Strongly agree", "Slightly agree", "Slightly disagree" and "Strongly disagree" for a questionnaire survey.

You might like to consider connecting something other than keyboard switches – for example, pressure mats to operate burglar alarms, or central-heating thermostats to monitor room temperature.

However, you're not limited to just four keys. By using all possible combinations of high and low states on the four signal lines, you can generate up to 15 different numbers (16 if you count 0).

Most keyboard switches are simple on/off devices and can't

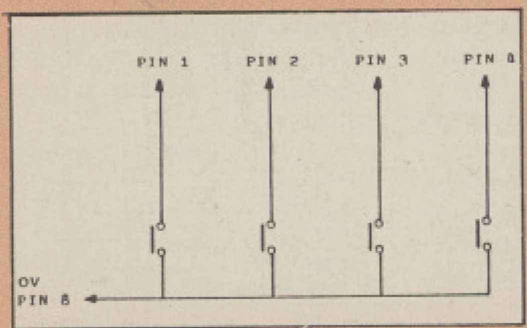


Figure I: Four extra keys

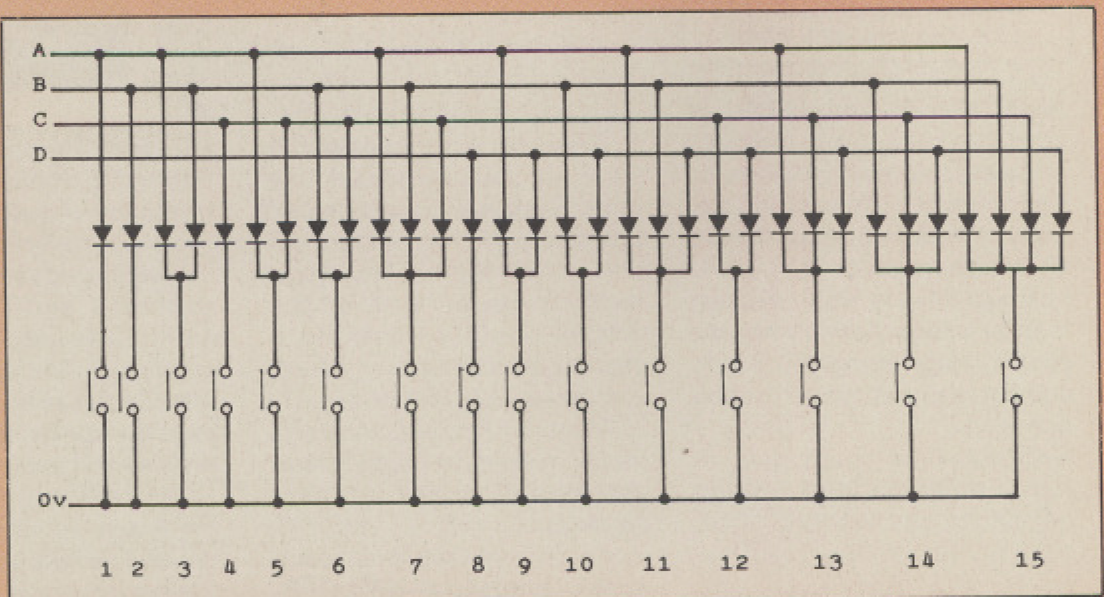
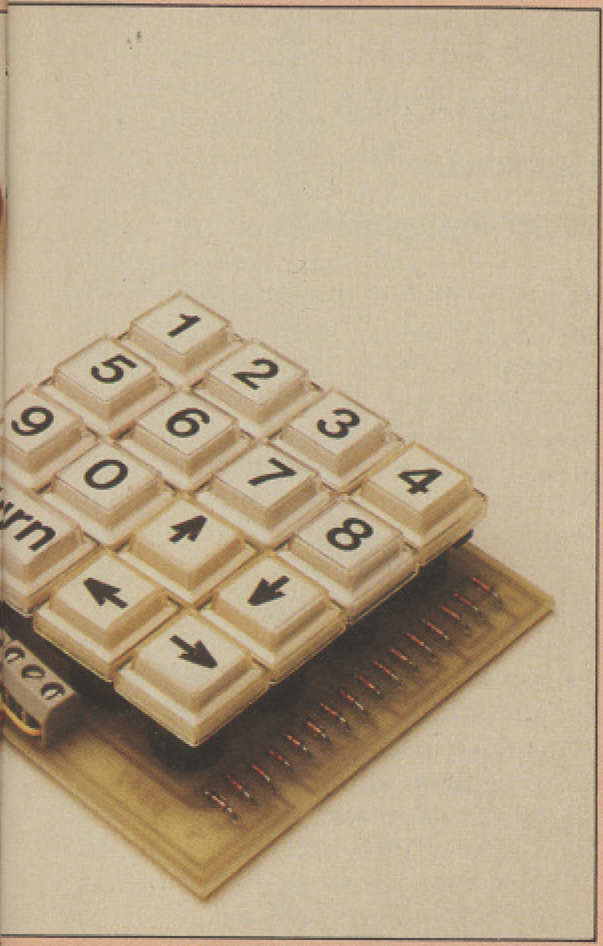


Figure II: This diode matrix allows fifteen separate on/off inputs to be channelled through a single joystick port



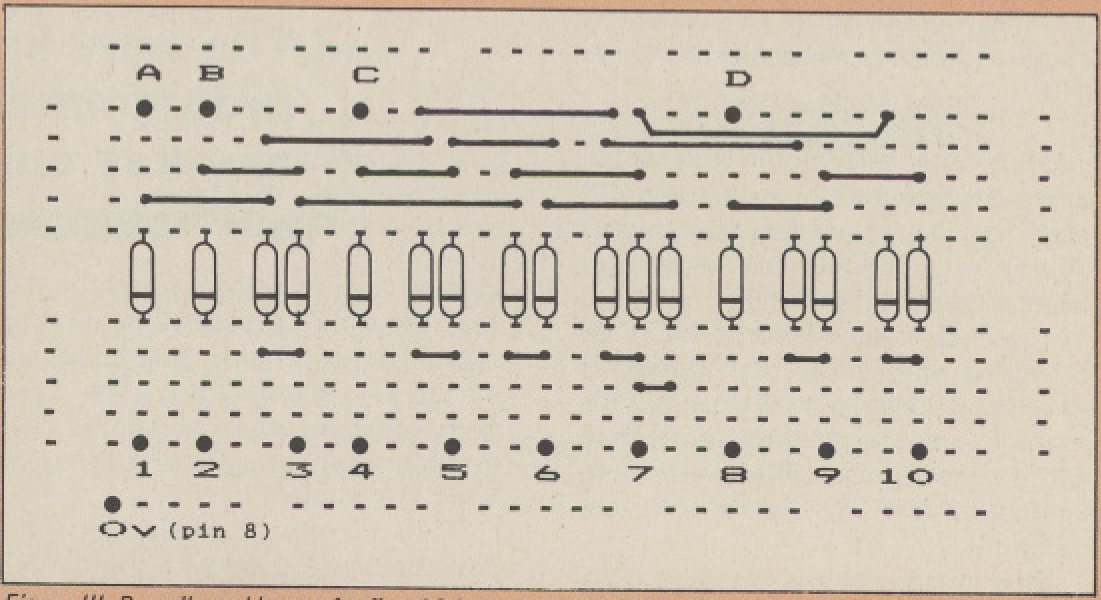


Figure III: Breadboard layout for first 10 keys. A, B, C, D are outputs to joystick port 1, pins 1, 2, 3 and 4. 1 to 10 are inputs – take out any one of them to 0v and the contents of address 632 will change

control more than one line without electronic help. But a simple diode matrix is all that's needed – and the circuit shown in Figure II will work perfectly well. When any of the keys is pressed, it connects one or more signal lines via the diodes to 0v, while the other lines remain held at 5v by circuitry inside the computer.

Figure III shows a practical layout on the Verobloc breadboard – there's room for only 10 of the 15 possible combinations, but you can see the general principle.

The diodes are marked with a black band at their cathode ends, and must be connected the correct way – cathodes to the switches. However, you won't do any damage by trying them both ways round.

Connect the breadboard to Port 1 using the joystick extension lead, then run Program I.

```
10 POKE 752,1:PRINT CHR$(125)
20 POSITION 2,5:PRINT PEEK(632);
" ";:GOTO 20
```

Program I

The number 15 will be displayed – meaning all lines are high. Now connect a test lead to the 0v line, touch it to each of the numbered points in turn and watch the number change on screen. The single touch action can be made to generate any number from 0 to 14.

Having established the principles of operation, we can move on to the keypad construction. A printed circuit board is available (see the parts list) and this makes assembly very straightforward.

If you have facilities to make your own, the foil pattern is given in Figure IV. Holes for the diodes are 0.8mm, those for the switches are 1.2mm and the fixing holes are 3mm or 1/8in. A ready-made board is available from RH Design, and this comes drilled and tinned ready for use.

For a professional finish, the design uses full-travel keyboard switches which have removable transparent covers so you can insert your own legends. The PCB holes are spaced so that the keys butt up to one another, avoiding the need for a complicated panel cut-out.

Solder the diodes first, making sure to get them the right way round (black band towards the centre of the PCB), then fit the terminal blocks and switches. Make sure the switch bodies sit firmly onto the board's surface with no gaps, otherwise

→

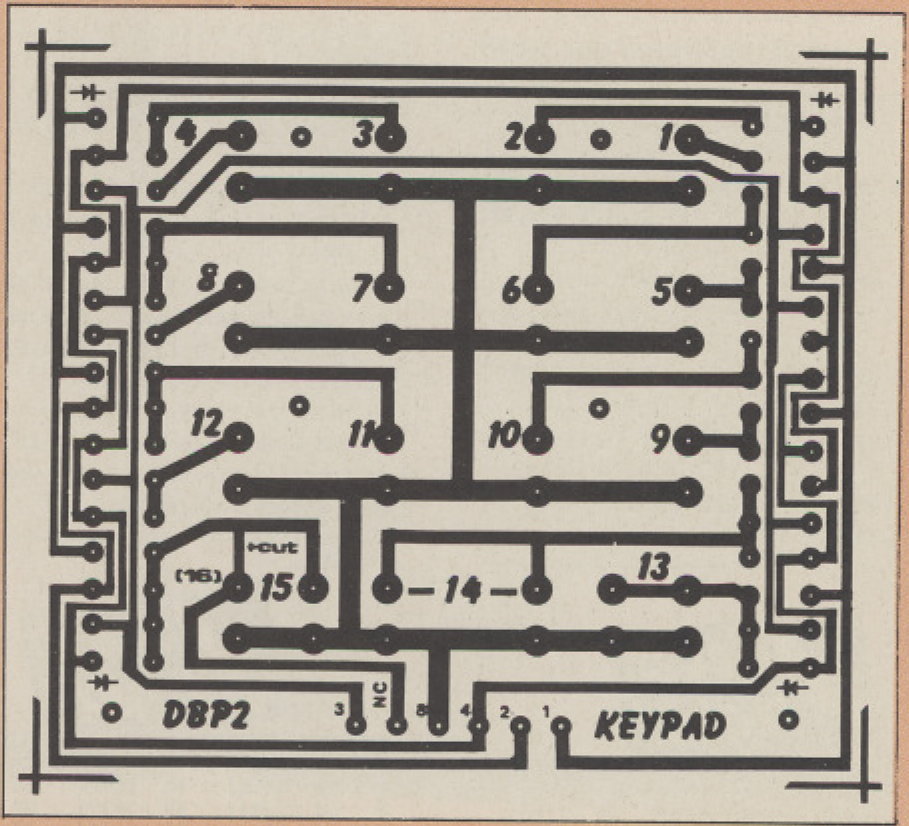


Figure IV: PCB foil pattern

constant pressing will cause the copper track to peel away from the PCB.

Fit a cable clip to anchor the joystick lead, and mount the whole assembly in a suitable case using at least four of the six mounting holes. The front panel cut-out should be 75mm square.

Now we need some software to drive the gadget. You could program it in Basic, just like a joystick, but it's more impressive if the new keypad can be made to act like the existing keyboard, with no visible software driving it.

This means using a machine-code routine to scan the keypad during the vertical blank interval and activate the operating system's keyboard handler whenever a key is pressed.

There is a shortcut here: Whenever you write a number into address 764, the computer thinks you have just pressed a key which generates that number, and will obediently print the corresponding character on screen for you.

Our software simply reads the keypad (address 632), converts the number into an appropriate keycode and stores it in address 764. The operating system does the rest.

Once in place, the routine will execute every fiftieth of a second, independently of any Basic program which may be running at the same time.

From the user's point of view, the only difference between our new keypad and the existing keyboard is that the new keys don't have auto-repeat, which helps guard against accidental double-entry. The standard keyboard keys can still be used in circumstances where auto-repeat is an advantage.

‘The new keys can be programmed to duplicate any key combinations’

Two different versions of the software are presented. Program II is the simpler, and runs as part of a Basic program using page 6 to store the machine code. Program III is the de-luxe version for disc drive owners.

It will create an AUTORUN.SYS file which boots automatically at power-up, resets the MEMLO pointer to make a safe area for our machine code and traps the SYSTEM RESET routine to ensure that the new keyboard stays active as long as the computer is switched on. This version is completely invisible to the user, and can be used with cartridge-based languages other than Basic.

Both programs work in exactly the same way. Pressing any keypad key will return a number from 0 to 14 in address 632. The bit pattern is inverted – which is equivalent to subtracting the number from 15 – and the result is used as an index into a table of keycodes supplied by you. The number retrieved from this table is written into address 764, then the operating system takes over to print out the selected character.

The new keys can be programmed to duplicate any of the standard keys – or key combinations – by changing the values in the keycode table. This table appears in the Basic programs as 15 entries in a single line of DATA (line 40 in Program II, line 70 in Program III), and can be altered simply by changing the values.

Let's say you want one of the new keys to print a comma, to allow you to type-in long DATA statements with one hand, and still hold down your program listing. First you need to find the keycode which corresponds to "," (it's not the Atascii number), so type-in and run this line:

10 PRINT PEEK(764):GOTO 10

then press "," on your keyboard. The number that comes up is the keycode you want – in this case 32.

Now decide which of your new keys you want to do the job, and get its number from the underside of the

```
10 FOR X=0 TO 59:READ D:POKE 1537+X,D:
NEXT X
20 DATA 104,162,6,160,12,169,7,32,92,2
28,96,173,120,2,73,15,240,21,174,0,6,2
08
30 DATA 19,134,77,170,202,189,46,6,141
,252,2,141,0,6,76,98,228,141,0,6,76,98
,228
40 DATA 31,30,26,24,29,27,51,53,48,50,
142,143,12,134,135
50 REM Line 40 contains the 15 key cod
es for: 1,2,3,4,5,6,7,8,9,0,Cursor up,
down,RETURN,left,right
60 X=USR(1537)
```

Program II

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	7650	20	11346	30	11781
40	8148	50	22428	60	2059

```
10 OPEN #1,8,0,"D:AUTORUN.SYS"
20 FOR X=1 TO 105:READ D:PUT #1,D:NEXT
 X
30 DATA 255,255,32,29,124,29,165,12,14
1,54,29,165,13,141,55,29,169,53,133,12
,169
40 DATA 29,133,13,76,56,29,32,75,29,16
9,126,141,231,2,169,29,141,232,2,162,2
9,160,76
50 DATA 169,7,32,92,228,96,173,120,2,7
3,15,240,21,174,125,29,208,19,134,77,1
70,202
60 DATA 189,110,29,141,252,2,141,125,2
9,76,98,228,141,125,29,76,98,228
70 DATA 31,30,26,24,29,27,51,53,48,50,
142,143,12,134,135
80 DATA 224,2,225,2,32,29
90 REM Line 70 contains the 15 key cod
es for: 1,2,3,4,5,6,7,8,9,0,Cursor up,
down,RETURN,left,right
```

Program III

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	5165	20	6880	30	11693
40	12304	50	12099	60	10295
70	8148	80	3532	90	22431

The parts for the keypad are available from Maplin Electronic Supplies, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702 552911.

Approximate cost £8.40.

A joystick extension lead is available from Tandy stores (code 276-1978) or from large computer shops.

The printed circuit board (order code DBP2) is available from: R.H. Design, 137 Stonefall Avenue, Harrogate, North Yorkshire.HG2 7NS. Tel: 0423 508359.

Price £3.40 including VAT and postage.

PCB. This tells you which of the 15 DATA values to change.

Let's say you want the comma to be printed by the double-width key. This is key number 13, so count to the thirteenth DATA entry and change the "12" to "32". Run the modified program and you're in business.

The specified key layout is suitable for most purposes, but you can set the double-width key to the right if you prefer. It then becomes key number 15, and the remaining two keys on that line become 13 and 14, as the PCB markings show.

There is also provision for a sixteenth key, so that you could make a hex keypad for use with the Assembler Editor cartridge. An extra input is needed for this, and the joystick trigger line is the obvious one to use.

To add a sixteenth key, cut the copper track where it is marked "cut" on the PCB, then connect joystick pin 6 to the terminal marked "NC". If you're programming the keypad in Basic, you'll need to combine the value in 632 with the trigger line value (644). Here's one way:

10 KEY=PEEK(632)+ 16*(PEEK(644)=0)

This returns the normal joystick values for keys 1 to 15, and 16 whenever the sixteenth key is pressed. However, if you want a hex pad, the chances are that you're already into machine code programming so you should have no difficulty modifying either of the source listings to take account of key 16. ■

PARTS REQUIRED FOR 15-KEY VERSION OF KEYPAD

		Maplin Order Codes
32	1N4148 signal diodes	QL80B
15	Keyboard switches	FF61R
14	Keytops (1 position)	FF62S
1	Keytop (2 position)	FF63T
2	3-way PC terminal blocks	RK72P
1	Cable 'P' clip 3/16in	LR44X

```
10 ATRACT   =    $4D
20 CH       =    $2FC
30 FLAG     =    $600
40 KEYPAD   =    $278
50 SETVB    =    $E45C
60 XITVBL   =    $E462
70          *=   $601
80 VBSET
90          PLA
0100        LDX  #VBCODE/256
0110        LDY  #VBCODE&255
0120        LDA  #7
0130        JSR  SETVB
0140        RTS
0150 VBCODE
0160        LDA  KEYPAD     Read pad
0170        EOR  #15        Invert the bit pattern
0180        BEQ  ZFLAG      Branch if no key pressed
0190        LDX  FLAG       Branch if same key
0200        BNE  EXIT       still held down
0210        STX  ATRACT     Prevent colour rotation
0220        TAX            Use Keypad value as
0230        DEX            index into TABLE, to find
0240        LDA  TABLE,X    corresponding character
0250        STA  CH         Store it in character register
0260        STA  FLAG       Set Flag >0 (disable keys)
0270        JMP  XITVBL     and exit
0280 ZFLAG
0290        STA  FLAG       Set flag =0 (enable keys)
0300 ;
0310 EXIT
0320        JMP  XITVBL     and exit
0330 TABLE
0340 ;
0350 ;Contains hardware key codes for
0360 ;1,2,3,4,5,6,7,8,9,0, Cursor up, cursor down, RETURN, cursor left and cursor right
0370 ;
0380        .BYTE 31,30,26,24,29
0390        .BYTE 27,51,53,48,50
0400        .BYTE 142,143,12,134,135
```

Assembler listing of Program II

```
05              .OPT NOEJECT
10 ATRACT   =    $4D
20 CH       =    $2FC
30 DOSINI   =    $0C
40 KEYPAD   =    $278
50 MEMLO    =    $2E7
60 SETVB    =    $E45C
70 XITVBL   =    $E462
80          *=   $1D20
90 COLDST
0100        LDA  DOSINI       Trap SYSTEM RESET
0110        STA  WARMST+1     routine
0120        LDA  DOSINI+1
0130        STA  WARMST+2
0140        LDA  #WARMST&255
0150        STA  DOSINI
0160        LDA  #WARMST/256
0170        STA  DOSINI+1
0180        JMP  WMST2
0190 WARMST
0200        JSR  OLDINIT
0210 WMST2
0220        LDA  #FINISH&255  Reset MEMLO to
0230        STA  MEMLO        protect our new
0240        LDA  #FINISH/256  machine code
0250        STA  MEMLO+1
0260        LDX  #VBCODE/256  Insert new vertical
0270        LDY  #VBCODE&255  blank vector
0280        LDA  #7
0290        JSR  SETVB
0300 OLDINIT
0310        RTS
0320 ;
0330 VBCODE
0340        LDA  KEYPAD       Read pad
0350        EOR  #15          Invert the bit pattern
0360        BEQ  ZFLAG        Branch if no key pressed
0370        LDX  FLAG         Branch if same key
0380        BNE  EXIT         still held down
0390        STX  ATRACT       Stop colour rotation
0400        TAX              Use Keypad value as
0410        DEX              index into TABLE, to find
0420        LDA  TABLE,X      corresponding character
0430        STA  CH           Store result in character register
0440        STA  FLAG         Set Flag >0 (disable keys)
0450        JMP  XITVBL       and exit
0460 ZFLAG
0470        STA  FLAG         Set Flag =0 (enable keys)
0480 EXIT
0490        JMP  XITVBL       and exit
0500 TABLE
0510        .BYTE 31,30,26,24,29
0520        .BYTE 27,51,53,48,50
0530        .BYTE 142,143,12,134,135
0540 FLAG   *=   *+1
0550 FINISH
0560        *=   $2E0
0570        .WORD COLDST
```

Assembler listing of Program III

IT is possible to access the player missile system without using the direct memory access method we have been using so far. This new method is much simpler to operate but has one major drawback – only a single byte can be plotted in the player stripe and this runs the whole height of the screen.

To see how easy it is to turn on a non-DMA player type:

POKE 53248,160:
POKE 53261,231

and press Return, and you will see a player stripe. The number 231 is the bit-mapped code that switches on selected pixels along the width of the stripe and this pattern is then copied on every row.

Locations 53261 and 53264 switch on players 0 to 3 and 53265 the missiles. The normal registers associated with player missile graphics can be used with non-DMA players – horizontal registers, colour, size, collision detection and so on – but vertical movement is impossible.

Program I is a demonstration of some of the effects that are possible with non-DMA players. The first section shows quadruple size player stripes adjacent to each other. The number 255 is POKEd to locations 53261 to 53265 to turn on all the pixels within each stripe.

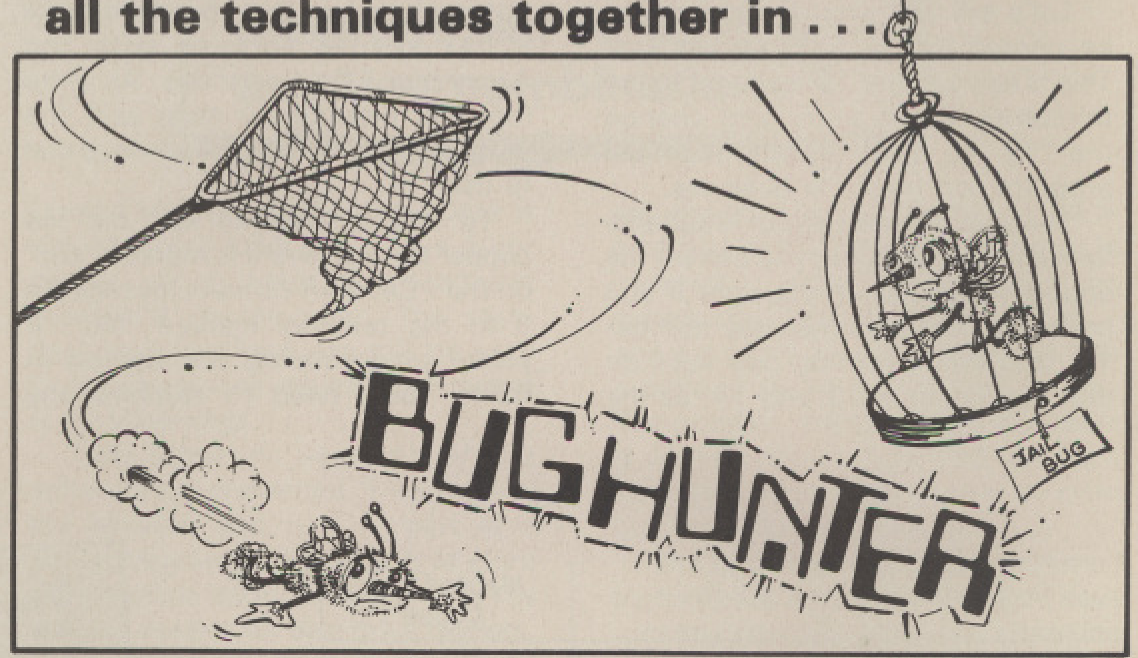
Additional colours are obtained on areas to the right of the screen where Playfield 0 (the text window) overlaps the players. The Graphics Mode 2 text at the top of the screen takes on a different colour depending on which player stripe it is over.

The programmer has little control over what colours appear – experiment by changing the colour registers in the program to see other combinations.

If the stripes remain next to each other, and are set to the same colour – as in the second section of the demonstration program – the effect is like creating a square playfield. Notice that text that appears on the right hand side takes on a different colour to that on the left.

Finally, the program shows double size stripes with selected pixels plotted and illustrates how easy it is to move all the stripes together. By altering priority (in register 625) the stripes can appear to travel over or underneath the text.

In part VI of his series on player missile graphics STEPHEN WILLIAMSON brings all the techniques together in . . .



Non-DMA players can be used as an easy method of creating additional colours to those normally possible on a graphic screen. They can also be used as borders, or incorporated into graphs and charts.

Program II is Bughunter, a game starring all the player shapes that have appeared in other programs in this series and demonstrates something of what can be achieved by the use of player missile graphics and the Basic language.

The object of the game is to catch a bug in a net and take it to the cage on the right of the screen. Treading on fruit, being bonked on the head by falling fruit or being stung by the bug costs one life. Points are awarded according to how long it takes to catch each bug – the longer the time taken, the lower the score.

To assist you in following the program, Figure I is a summary of all the main registers associated with the player missile system.

Player 0 is the man, Player 1 the top of the tree, Player 2 the net and Player 3 the bug. The falling fruit are missiles.

Playfield 1 is the tree trunk and vertical cage bars, Playfield 2 the border line and top of the cage, and Playfield 3 the dark green ground at the bottom of the screen (set to the same colour as the text window).

The listing is liberally sprinkled with REM statements that document each section of the program. Lines 60 to 740 initialise everything. They reserve the player missile data area, set the PMBASE address, load shape and machine code data, set colour, size and horizontal registers, set initial values for the variables and set the Atari clock registers to zero.

If you have followed the rest of this series then a lot of these routines will already be familiar to you as they are fairly standard player missile initialisation procedures.

Three machine code routines are included in the game, the same ones used in previous programs in this series. The first is a high speed clearance routine that clears any garbage that may have accumulated within the player data area. Line 200 calls up this routine.

The second routine transfers specified bytes from one area of memory to another and is used to control up and down movement of Player 3 (the bug). The last routine handles the downward movement of the missiles.

Bughunter is written in a series of subroutines. Each is responsible for a particular operation of the program – movement, collision detection, sound effects and so on. Lines 760 to 830, the control routine, decide the order in which these subroutines are accessed.

This type of program structure makes both writing the program and fault finding much easier than if the program was written largely in one continuous section.

If, for example, there is a fault in missile movement, then it is a safe bet to assume that the error lies within

the missile movement routine (lines 1080 to 1120) or the re-plot missile routine (lines 1640 to 1670).

Line 760 prevents the game going into the attract mode which normally happens if no key has been pressed for about 9 minutes, causing the Atari to cycle its screen colours.

If the joystick is not in the central position with STICK(0) equal to 15, then POKE 77,0 stops the attract mode clock.

The first subroutine that the control routine calls is found between lines 850 and 950. These lines handle movement of Player 0, the man, and Player 2, the net. Players move horizontally unless the man has been hit by fruit or the bug (this situation is handled in a later subroutine).

If the joystick is moved left or right, then the horizontal register (HORIZ) is increased or decreased by 2 and the updated horizontal coordinates POKEd to the Player 0 and Player 2 registers.

The man and net movement routine is called up twice from the control routine for each cycle of the game. This gives additional speed for the man and net compared to the bug, so that the player has a chance of actually catching it.

Line 920 checks if the bug is in the net, (when the variable *NET* is set to 1), and if the man has reached the cage at horizontal position 48. If both these conditions are met the program POPs out of the routine to increase the score.

Line 940 checks to see if the bug has touched the net. If it has, the program branches to 1140 to see if the catch was successful. If the bug has been caught, line 930 moves the bug, Player 3, along with the net.

Player 3 movement is handled in lines 970 to 1080. Line 970 checks the Player 3 collision register to find out whether the bug has touched the ground (Playfield 3) in order to send it flying upwards again by resetting the direction change when the bug is about halfway up the screen during its upward flight. Line 990 alters the horizontal coordinate (stored in variable *HORIZ3*) by a random amount to

Type	PL0	PL1	PL2	PL3	M0	M1	M2	M3
Horizontal position	53248	53249	53250	53251	53253	53254	53255	
Playfield collision	53252	53253	53254	53255	53248	53249	53250	53251
Player collision	53260	53261	53262	53263	53256	53257	53258	53259
Size	53256	53257	53258	53259	53260	53260	53260	53260
Non-DMA player	53261	53262	53263	53264	53265	53256	53256	53265
Colour	704	705	706	707	704	705	706	707
Data Area* – Single – Double	1024 512	1280 640	1536 768	1792 896	768 384	768 384	768 384	768 384

** All data area addresses are relative to PMBASE. Location 53279 needs to hold the PMBASE address (in pages) for the DMA system to work.*

POKE 53278,0 clears all collision registers.

POKE 53277 options – 1 turn on missiles, 2 turn on players, 4 latch trigger.

559 options

0 No PF
1 Narrow PF
2 Standard PF
3 Wide PF
4 Enable M DMA (Missiles)
8 Enable PL DMA (Playing)
12 Enable DMA (both)
16 Single resolution
32 Enable DMA system

623 options

1 Priority PL 0-3,PF0-3,BAK
2 Priority PL 0-1,PF 0-3,PL 2-3,BAK
4 Priority PF 0-3,PL 0-3,BAK
8 Priority PF 0-1, PL 0-3 PF 2-3,BAK
16 All missiles to have same colour
32 Overlaps of players to have 3rd colour.

PL=Player M=Missile
PF=Playfield BAK=Background

Figure I: Player Missile registers

→

```
10 REM  PLAYER MISSILE GRAPHICS
20 REM  by Stephen Williamson
30 REM  for Atari User
40 REM  ANTIC BYPASS
50 REM  PROGRAM I - PART 6
60 GRAPHICS 2:SETCOLOR 1,0,12
70 SETCOLOR 2,12,8:SETCOLOR 4,4,6
80 POSITION 2,2:? #6;"non dma players"
90 POKE 53256,3:POKE 53257,3
100 POKE 53258,3:POKE 53259,3
110 POKE 53248,60:POKE 53249,92
120 POKE 53250,124:POKE 53251,156
130 POKE 704,50:POKE 705,178:POKE 706,
22:POKE 707,82
140 POKE 53261,255:POKE 53262,255
150 POKE 53263,255:POKE 53264,255
160 FOR DELAY=0 TO 2000:NEXT DELAY
170 GRAPHICS 17
180 FOR I=0 TO 4:POKE 704+I,36:POKE 53
261+I,255:NEXT I
190 POSITION 4,4
200 ? #6;"all   players":POSITION 4,6:
? #6;"same  colour"
210 FOR DELAY=0 TO 2000:NEXT DELAY
220 GRAPHICS 18:POSITION 4,4
230 POSITION 6,5:? #6;"players"
240 POSITION 6,6:? #6;"CAN":POSITION 6
,7:? #6;"move"
250 POSITION 6,7:? #6;"move"
260 FOR I=0 TO 3:POKE 53256+I,1:POKE 5
3261+I,170
270 POKE 704+I,32*I+4:NEXT I
280 POKE 623,1
290 FOR I=60 TO 160:POKE 53248,I
300 POKE 53249,16+I:POKE 53250,32+I
310 POKE 53251,48+I
320 FOR DELAY=0 TO 20:NEXT DELAY
330 NEXT I
340 POKE 623,0
350 FOR I=160 TO 60 STEP -1:POKE 53248
,I
360 POKE 53249,16+I:POKE 53250,32+I
370 POKE 53251,48+I
380 FOR DELAY=0 TO 20:NEXT DELAY
390 NEXT I
400 GOTO 60
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	15706	20	16910	30	15706
40	14381	50	14581	60	5104
70	5783	80	7954	90	4387
100	4397	110	4618	120	5195
130	8524	140	5225	150	5229
160	6014	170	2150	180	8867
190	2361	200	12407	210	6014
220	4943	230	5637	240	9032
250	4848	260	7543	270	4434
280	1837	290	4839	300	5338
310	2635	320	5655	330	1345
340	1836	350	6219	360	5338
370	2635	380	5655	390	1345
400	1426				

Program I

D	Vertical direction increment (-1 =up, 1 =down).
DOWN	Vertical coordinate for players.
HORIZ	Horizontal coordinate for players.
LIVES	Number of lives left.
M	Vertical coordinate of missiles.
NET	Bug in net flag (1=in net, 0=not in net).
PMB	Data area address in pages.
PMBASE	Data area address in bytes.
SCORE	Total score.
SCORE1	Score of last bug catch.

Figure II: Main variables used in Bughunter

give the bug its jerky flight pattern, and lines 1000 to 1010 check the horizontal coordinates to prevent it flying off the screen.

Lines 1030 and 1050 use the machine code routine to re-plot the bug shape, first with wings, then without, to give the illusion of flapping.

The sound effect for the flying bug is sorted out in line 1040. The two sound channels are changed according to the current vertical position of the bug stored in the variable *DOWN*.

Missile movement is processed in lines 1080 to 1120. Missiles only move down and line 1090 calls the machine code routine that moves them down the missile stripes. A fresh set of missiles is plotted at the top of the tree when the missile vertical variable *M* has reached a random value between 44 and 50 (calculated in line 1110).

This means that either the missile fruit will stay above ground to become a hazard to the man, or will fall to a position that allows the man to pass over it.

Lines 1140 to 1210 check to see whether the bug is in the net.

Line 1150 sees if the horizontal position of the bug corresponds to that of the net. If this is not the case, the rest of the routine is not entered.

Another check is made in line 1160 to see whether the bug is below the net or flying upwards. Lines 1150 to 1160 determine the conditions under which a successful catch is made. The bug must be flying down into the net, and must be caught at exactly the right horizontal position. To make the game easier, these two lines could be altered to allow a greater margin of error.

If the bug has been successfully caught then *NET* is set to 1 and the bug moves 4 pixels down so that it appears to sink into the net (line 1200).

If the bug has been put inside the cage then lines 1220 to 1300 update the score. Locations 18, 19 and 20 keep count of the internal clock. Line 2230 works out how much time has elapsed since the clock was reset during the initilisation routine and subtracts this time from 10000 to give a score based on how long it has taken to catch and cage the bug.

The rest of this subroutine updates the current score and performs some initialisation functions before re-starting the game.

Lines 1310 to 1380 check the collision detection registers to see if the bug (Player 3) or the missiles have hit the man. If a collision has been detected then the program jumps to the man dead routine at 1450.

The sound routine at 1380 to 1430 mimics an alarm sound when the bug has been caught.

Lines 1450 to 1620 control things after the man has been hit. The FOR ... NEXT loop between 1460 and 1500 moves man and net 14 pixels down the screen which, because of the shape priority options set at location 623, means that the players pass underneath Playfield 3 (the ground), appear to sink into the earth.

Line 1510 reduces the remaining lives by 1. If no lives remain then the program waits for the start key to be pressed before re-initialising the game. Address 53279 detects the Option, Select or Start keys.

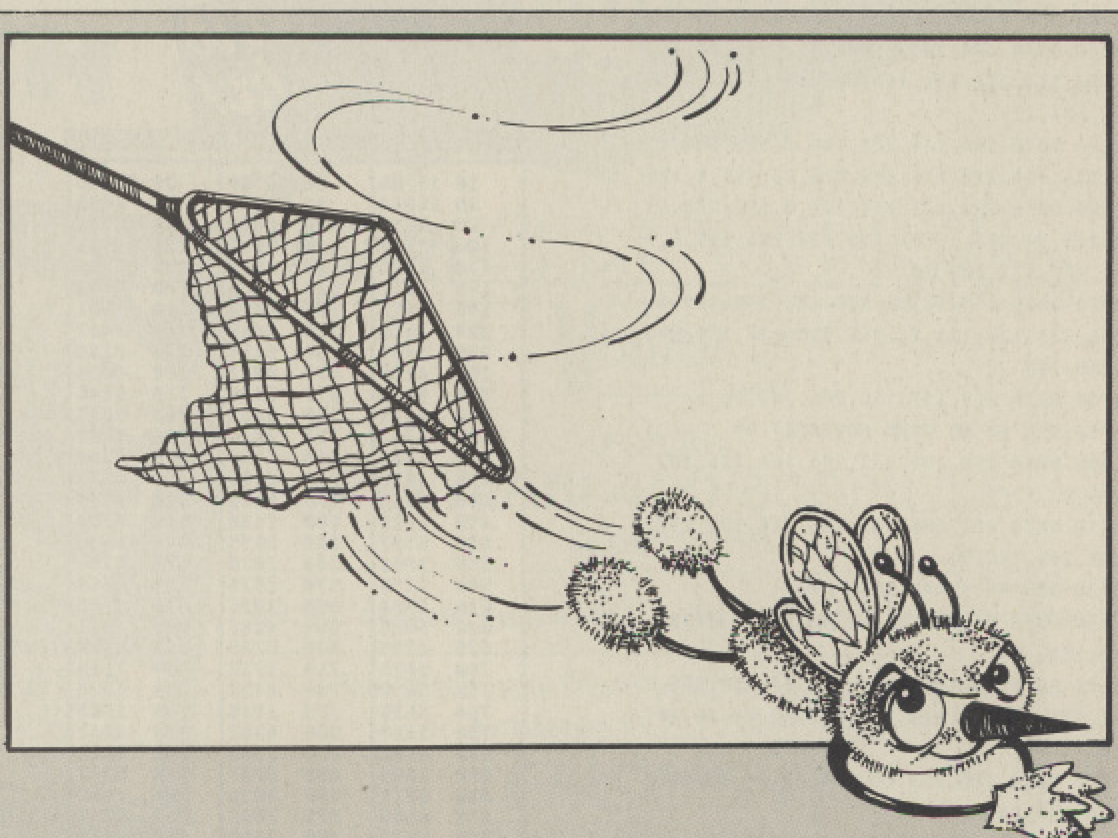
The rest of the man hit routine initialises the system ready to start the program again, and lines 1640 re-plot the missiles near Player 1 (the top of the tree).

● *Now you've seen how to write a simple game using player missile graphics, why not have a go at creating a program of your own?*

Program II

```
10 REM  PLAYER MISSILE GRAPHICS
20 REM  by Stephen Williamson
30 REM  for Atari User
40 REM  ANTIC BYPASS
50 REM  PROGRAM I - PART 6
60 GRAPHICS 2:SETCOLOR 1,0,12
70 SETCOLOR 2,12,8:SETCOLOR 4,4,6
80 POSITION 2,2:? #6;"non dma players"
90 POKE 53256,3:POKE 53257,3
100 POKE 53258,3:POKE 53259,3
110 POKE 53248,60:POKE 53249,92
120 POKE 53250,124:POKE 53251,156
130 POKE 704,50:POKE 705,178:POKE 706,
22:POKE 707,82
140 POKE 53261,255:POKE 53262,255
150 POKE 53263,255:POKE 53264,255
160 FOR DELAY=0 TO 2000:NEXT DELAY
170 GRAPHICS 17
180 FOR I=0 TO 4:POKE 704+I,36:POKE 53
261+I,255:NEXT I
190 POSITION 4,4
200 ? #6;"all   players":POSITION 4,6:
? #6;"same  colour"
210 FOR DELAY=0 TO 2000:NEXT DELAY
220 GRAPHICS 18:POSITION 4,4
230 POSITION 6,5:? #6;"players"
240 POSITION 6,6:? #6;"CAN":POSITION 6
,7:? #6;"move"
250 POSITION 6,7:? #6;"move"
260 FOR I=0 TO 3:POKE 53256+I,1:POKE 5
3261+I,170
270 POKE 704+I,32*I+4:NEXT I
280 POKE 623,1
290 FOR I=60 TO 160:POKE 53248,I
300 POKE 53249,16+I:POKE 53250,32+I
310 POKE 53251,48+I
320 FOR DELAY=0 TO 20:NEXT DELAY
330 NEXT I
340 POKE 623,0
350 FOR I=160 TO 60 STEP -1:POKE 53248
,I
360 POKE 53249,16+I:POKE 53250,32+I
370 POKE 53251,48+I
380 FOR DELAY=0 TO 20:NEXT DELAY
390 NEXT I
400 GOTO 60
3
380 POKE 53252,126:POKE 53255,109:POKE
 53254,119
390 REM *** INITIALSE VERT. POSITIONS*
400 DOWN=39:D=1
410 REM ** SET COLOURS **
420 POKE 704,204:POKE 705,198
430 POKE 706,88:POKE 707,174
440 POKE 709,28:POKE 710,194
450 POKE 711,54:POKE 712,132
460 REM ** SET SIZES **
470 POKE 53256,1:POKE 53260,1:POKE 532
57,3
480 POKE 53260,81
490 REM ** CLEAR COLLISION REGISTERS *
500 POKE 53278,0
510 REM ** SET TIME TO ZERO **
520 POKE 18,0:POKE 19,0:POKE 20,0
```

```
530 REM ** DRAW PLAYFIELDS 1,2 & 3 **
540 COLOR 2:PLOT 0,0:DRAWTO 79,0
550 DRAWTO 79,39
560 PLOT 0,39:DRAWTO 0,0
570 COLOR 3:PLOT 79,39:DRAWTO 0,39
580 PLOT 0,38:DRAWTO 79,38
590 PLOT 0,37:DRAWTO 79,37:PLOT 0,36
600 DRAWTO 79,36
610 COLOR 2:PLOT 70,30:DRAWTO 78,30
620 COLOR 1
630 FOR I=70 TO 78 STEP 2
640 PLOT I,30:DRAWTO I,38:NEXT I
650 PLOT 32,26:DRAWTO 32,39
660 PLOT 33,26:DRAWTO 33,39
670 PLOT 34,26:DRAWTO 34,39
680 REM ** SWITCH ON PM SYSTEM **
690 POKE 53277,3
700 REM ** CLEAR SCREEN/DISPLAY TEXT *
710 ? CHR$(125)
720 POSITION 0,2:? "SCORE
 ++++++";SCORE
730 ? "LAST CATCH          ++++++";SCO
RE1:REM 10 SPACES
740 ? "LIVES LEFT    ";LIVES
750 REM *** CONTROL ROUTINE ***
760 IF STICK(0)<>15 THEN POKE 77,0
770 GOSUB 850
780 GOSUB 1070
790 IF NET=1 THEN 820
800 DOWN=DOWN+D:GOSUB 970
810 GOSUB 1320
820 IF NET=1 THEN GOSUB 1380
830 GOSUB 850:GOTO 760
840 REM ** MOVE PLAYER 0-2 **
850 S=STICK(0)
860 IF S=11 THEN HORIZ=HORIZ-2
870 IF S=7 THEN HORIZ=HORIZ+2
880 IF HORIZ<-82 THEN HORIZ=-82
890 IF HORIZ>48 THEN HORIZ=48
900 POKE 53248,HORIZ0+HORIZ
910 POKE 53250,HORIZ2+HORIZ
920 IF NET=1 AND HORIZ=48 THEN POP :GO
TO 1230
930 IF NET=1 THEN POKE 53251,HORIZ3+HO
RIZ:RETURN
940 IF PEEK(53263)=4 THEN GOSUB 1140
950 RETURN
960 REM ** PLAYER 3 MOVE ***
970 IF PEEK(53255)=4 THEN D=-1
980 IF DOWN<120 THEN D=1
990 HORIZ3=HORIZ3+(-7+INT(RND(1)*16))
1000 IF HORIZ3<52 THEN HORIZ3=52
1010 IF HORIZ3>180 THEN HORIZ3=180
1020 POKE 53251,HORIZ3
1030 A=USR(1580,PMBASE,PMBASE+1792+DOW
N,13)
1040 SOUND 0,DOWN,10,12:SOUND 1,DOWN*2
,12,12
1050 A=USR(1580,PMBASE+13,PMBASE+1792+
DOWN,13)
1060 RETURN
1070 REM **MOVE MISSILES**
1080 M=M+1
1090 A=USR(1670,PMBASE+768+124+M)
1100 IF M=50 THEN GOSUB 1640:M=0
1110 IF M=INT(RND(1)*4)+44 THEN M=0:GO
SUB 1640
```



```
1120 RETURN
1130 REM ** P3  IN NET? **
1140 SOUND 0,0,0,0
1150 IF HORIZ3<>(HORIZ2+HORIZ) THEN RE
TURN
1160 IF DOWN>158 OR D=-1 THEN RETURN
1170 HORIZ3=HORIZ2
1180 POKE 53251,HORIZ3+HORIZ
1190 NET=1
1200 FOR X=0 TO 4:A=USR(1580,PMBASE,PM
BASE+1792+DOWN+X,13):NEXT X
1210 POP :RESTORE :GOTO 760
1220 REM *** P3 IN CAGE ***
1230 SCORE1=10000-(256*PEEK(18)+256*PE
EK(19)+PEEK(20))
1240 IF SCORE1<0 THEN SCORE1=0
1250 POKE 18,0:POKE 19,0:POKE 20,0
1260 SCORE=SCORE+SCORE1
1270 FOR X=0 TO 20:POKE PMBASE+1792+DO
WN+X,0:NEXT X
1280 POKE 53251,0
1290 NET=0
1300 RESTORE 1830:A=USR(1536,PMBASE,20
48):GOTO 240
1310 REM *** COLLISION DETECTION ***
1320 IF PEEK(53259)=1 OR PEEK(53259)=3
 THEN GOTO 1450
1330 IF PEEK(53258)=1 OR PEEK(53258)=3
 THEN GOTO 1450
1340 IF PEEK(53256)=1 OR PEEK(53256)=3
 THEN GOTO 1450
1350 IF PEEK(53263)=1 OR PEEK(5.3263E-
62)=5 THEN GOTO 1450
1360 POKE 53278,0:RETURN
1370 REM ** SOUND ALARM **
1380 SOUND 0,0,0,0:SOUND 1,0,0,0
1390 FOR X=0 TO 2:FOR Y=2 TO 0 STEP -1
1400 SOUND 1,64,14,10-X:SOUND 0,56,14,
10-Y:NEXT Y:NEXT X
1410 SOUND 0,0,0,0:SOUND 1,0,0,0
1420 GOSUB 1320
1430 RETURN
1440 REM **MAN HIT**
1450 SOUND 0,0,0,0:SOUND 1,0,0,0
1460 FOR X=0 TO 14
1470 A=USR(1670,PMBASE+1024+163+X)
1480 A=USR(1670,PMBASE+1536+161+X)
1490 SOUND 0,40+X,4,14-X
1500 NEXT X
1510 LIVES=LIVES-1:IF LIVES=0 THEN ? "
+PRESS START FOR ANOTHER GO";
1520 IF LIVES=0 AND PEEK(53279)=7 THEN
 1520
1530 IF LIVES=0 THEN LIVES=3:SCORE=0
1540 POKE 53251,0
1550 FOR X=0 TO 20:POKE PMBASE+1792+DO
WN+X,0
1560 POKE PMBASE+1024+177+X,0
1570 POKE PMBASE+1536+175+X,0
1580 NEXT X
1590 HORIZ=0:M=0
1600 POKE 53250,0:POKE 53248,0
1610 POKE 53278,0:NET=0
1620 RESTORE 1830:POP :A=USR(1536,PMBA
SE,2048):GOTO 240
1630 REM *** RE-PLOT MISSILES ***
1640 POKE PMBASE+768+130,160:POKE PMBA
SE+768+127,1
1650 POKE PMBASE+768+131,160:POKE PMBA
SE+768+128,1
1660 POKE PMBASE+768+132,160:POKE PMBA
SE+768+129,1
1670 REM POKE PMBASE+768+133,160:POKE
PMBASE+768+139,1
1680 RETURN
1690 REM ** M/C CLEAR ROUTINE **
1700 DATA 104,104,133,204,104,133,203,
104,133,206,104,133,205,166,206
1710 DATA 160,0,169,0,145,203,136,208,
251,230,204,202,48,6,208,244,164
1720 DATA 205,208,240,198,204,160,0,14
5,203,96
```

```
1730 REM **M/C VERTICAL MOVEMENT **
1740 DATA 104,201,3,208,81,104,133,225
,104,133,224,104,133,227,104,133,226,1
04,133,229
1750 DATA 104,133,228,169,0,133,230,13
3,231,168,177,224,145,226,24,169,1,101
1760 DATA 224,133,224,169,0,101,225,13
3,225,24,169,1,101,226,133,226,169,0,1
01,227,133,227,24
1770 DATA 169,1,101,230,133,230,169,0,
101,231,133,231,24,165,228,197,230,208
,206,165
1780 DATA 229,197,231,208,200,96
1790 REM ** MC DOWN MOVEMENT **
1800 DATA 104,104,133,204,104,133,203,
160,21,177
1810 DATA 203,200,145,203,136,136,192,
255,208,245,96
1820 REM ** SHAPE DATA ***
1830 DATA 24,36,24,90,126,60,24,24,24,
36,102
1840 DATA 24,60,60,44,126,90,118,237,2
51,175,251,62,118,110,126,52,60,44,60,
24
1850 DATA 255,169,85,170,84,42,84,40,2
0,40,60,24
1860 DATA 0,40,146,214,254,238,254,238
,186,170,56,16,0
1870 DATA 0,40,16,16,56,40,56,40,56,40
,56,16,0
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	15706	20	16908	30	15786
40	14014	50	14675	60	4006
70	2497	80	6032	90	5743
100	2770	110	2866	120	2903
130	1934	140	1973	150	5758
160	3212	170	561	180	6095
190	7512	200	8451	210	7563
220	7520	230	4489	240	9407
250	9487	260	9469	270	8183
280	4296	290	8047	300	8056
310	8065	320	6885	330	6246
340	4614	350	1462	360	5813
370	6767	380	7830	390	6751
400	2208	410	3928	420	4384
430	4392	440	4404	450	4338
460	3618	470	6646	480	2335
490	6820	500	2128	510	4784
520	5397	530	5695	540	5340
550	2269	560	3838	570	5708
580	4192	590	5978	600	2260
610	5784	620	1395	630	3705
640	5533	650	4287	660	4291
670	4295	680	5700	690	2136
700	6823	710	1737	720	7668
730	8094	740	4428	750	5075
760	5526	770	1918	780	1960
790	2889	800	4362	810	1947
820	4484	830	3582	840	4422
850	2006	860	5207	870	5087
880	5219	890	5026	900	4662
910	4665	920	7642	930	8754
940	5573	950	1498	960	4460
970	4498	980	3713	990	6110
1000	5143	1010	5542	1020	3315
1030	7407	1040	7231	1050	7514
1060	1498	1070	4319	1080	941

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1090	5073	1100	4749	1110	7302
1120	1498	1130	3461	1140	2321
1150	7756	1160	6179	1170	2862
1180	4669	1190	1085	1200	11138
1210	4222	1220	3555	1230	8482
1240	4858	1250	5397	1260	3890
1270	8723	1280	2111	1290	1084
1300	8292	1310	5746	1320	8365
1330	8360	1340	8350	1350	9132
1360	4012	1370	3764	1380	4713
1390	6033	1400	9634	1410	4713
1420	1947	1430	1498	1440	2861
1450	4713	1460	2297	1470	5332
1480	5341	1490	3629	1500	1375
1510	12447	1520	6874	1530	6270
1540	2111	1550	7322	1560	4447
1570	4475	1580	1375	1590	2236
1600	4370	1610	3362	1620	9259
1630	5403	1640	8047	1650	8056
1660	8065	1670	8886	1680	1498
1690	5036	1700	9787	1710	9911
1720	6328	1730	5787	1740	12129
1750	10715	1760	13216	1770	12068
1780	4275	1790	5062	1800	6605
1810	7213	1820	3577	1830	6118
1840	11081	1850	6713	1860	7676
1870	6298				



Tired of typing?

Take advantage of our finger-saving offer on Page 53.

THIS month's type-in game is an epic. Written in a combination of Basic and machine code, Cubes in Space follows the Q*Bert style format, with some very colourful Antic Mode 4 graphics and Player Missiles.

This is the scenario: You have become bored with destroying yet more alien invaders, jumping on and off platforms and running around mazes feeling peckish.

Realising there is now a gap in your life you have decided to indulge in a little bit of extra-terrestrial graffiti by drawing lines all around the galaxy-renowned Space Cubes, home of the now liberated Pacmen clan. (It seems that you weren't the only one bored with running around mazes . . .)

The Pacmen are naturally not at all amused by your vandalistic activities, and decide to have a go at stopping you. Everybody knows that wild Pacmen are quite harmless, but due to their prolonged stay in space these ones have become contaminated by assorted cosmic rays and the like, and are hence likely to burn you to a frazzle if you come into contact. You are advised to give them as wide a berth as possible.

There are eight different combinations of Space Cubes – each a little harder to cover than the last. After completing the eighth level you move on to level one again at a higher speed.

You move your graffiti marker with the joystick, but note that movement is diagonal only.

You lose one of your lives if you run into a radioactive Pacman or fall off the side of the Cubes. The game may be paused at any time by pressing the spacebar.

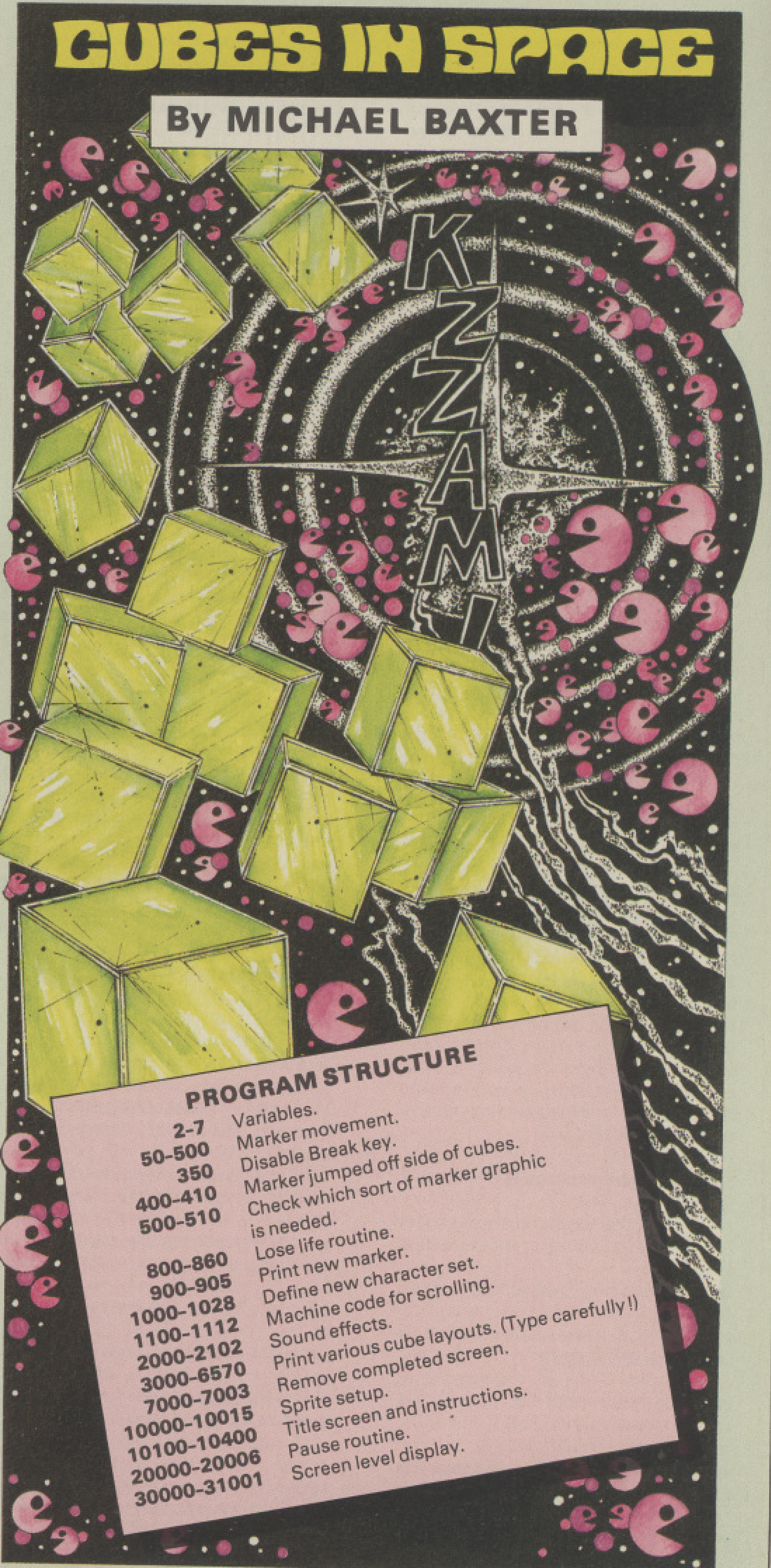
Be especially careful when typing in lines 1110 to 1112 (scrolling) and 10010 to 10015 (sprite movement).

There are lots of other data and print statements to keep you busy, so try to make sure that you type in all of the special characters correctly. Don't forget that if you have any problems the checksum should help – or why not get the completed program on the monthly cassette or disc? ■

Full listing starts on Page 30

CUBES IN SPACE

By MICHAEL BAXTER



PROGRAM STRUCTURE

2-7	Variables.
50-500	Marker movement.
350	Disable Break key.
400-410	Marker jumped off side of cubes.
500-510	Check which sort of marker graphic is needed.
800-860	Lose life routine.
900-905	Print new marker.
1000-1028	Define new character set.
1100-1112	Machine code for scrolling.
2000-2102	Sound effects.
3000-6570	Print various cube layouts. (Type carefully!)
7000-7003	Remove completed screen.
10000-10015	Sprite setup.
10100-10400	Title screen and instructions.
20000-20006	Pause routine.
30000-31001	Screen level display.

```
0 REM  * Cubes in Space * By M.Baxter
1 REM ******************************
      * For Atari User, October 1986 *
      ******************************
2 GOSUB 350:POKE 559,N:ST=632:FF=15:X=
13:Y=16:DIM A$(40),M1$(4),M2$(4),M3$(4
),M4$(4),M5$(4),M6$(4),D1$(4)
3 NE=1:TW=2:TR=3:FR=4:FV=5:SX=6:SV=7:A
T=8:NI=9:TN=10:HU=100:LEV=NE:LI=FR:SP=
SX
4 M3$="[graphics]":M1$="[graphics]":M2$="[graphics]":M4$
="[graphics]":M5$="[graphics]":M6$="[graphics]"
5 DIM OP$(FR),OP1$(FR),OP2$(FR),OP3$(F
R),OP4$(FR)
6 OP1$="#$%&":OP2$="\[?@":OP3$="#$?@":
OP4$="\[%&"
7 DIM PMV$(100),P0$(30),P2$(30):MV=ADR
(PMV$)
8 GOSUB 10000:IF PEEK(1720)<>PEEK(106)
-16 THEN GOSUB 1000
9 GOSUB 10100:REM  Title Screen
10 GOSUB 30000:OP$=OP2$:GOSUB 3000
49 REM  Move Marker & Enemy
50 S=STICK(N):POKE 77,N:IF PEEK(764)<>
255 THEN 20000
51 GOTO 90
52 GOTO 110
53 POKE 53278,N
54 IF S=TN THEN GOSUB 80:X=X-TW:Y=Y-TR
:GOSUB 500
55 IF S=SX THEN GOSUB 80:X=X+TW:Y=Y-TR
:GOSUB 500
56 IF S=FV THEN GOSUB 80:X=X+TW:Y=Y+TR
:GOSUB 500
57 IF S=NI THEN GOSUB 80:X=X-TW:Y=Y+TR
:GOSUB 500
70 GOTO 50
80 POSITION X,Y+NE:? "'(+,":POSITION X
,Y:? OP$:RETURN
89 REM  Move Mutant Pacmen
90 IF XMIS>200 THEN 100
95 XMIS=XMIS+SP:E=USR(MV,N,PLM,PLM0,XM
IS,YMIS,AT):SOUND N,XMIS,TN,TW:IF PEEK
(53252)=FF THEN 400
96 GOTO 52
100 XMIS=50:G=INT(RND(N)*80):YMIS=16+G
:GOTO 52
110 IF BMIS>HU THEN 120
111 BMIS=BMIS+SP:E=USR(MV,NE,PLM,PLM1,
AMIS,BMIS,AT):SOUND NE,BMIS,TN,TW:IF P
EEK(53253)=FF THEN 400
115 GOTO 53
120 BMIS=16:G=INT(RND(N)*88):AMIS=84+G
:GOTO 53
275 IF DAT1<>36 AND DAT1<>91 AND DAT1<
>32 THEN GOSUB 350:EX=EX+TW:EY=EY-TR:G
OSUB 250
300 FOR G=N TO TR:SOUND G,N,N,N:NEXT G
:RETURN
350 POKE 16,64:POKE 53774,64:RETURN :R
EM  Disable Break Key
400 FOR G=HU TO N STEP -TW:POKE 711,PE
EK(53770):SOUND N,G,AT,TN:SOUND NE,G+N
E,12,FR:SOUND TW,G+TW,SX,AT:NEXT G
401 SOUND TW,N,N,N
405 FOR G=FF TO N STEP -0.25:SOUND N,8
0,AT,G:POKE 711,G:SOUND NE,81,SX,ABS(G
-NE):NEXT G
406 SOUND N,N,N,N:SOUND NE,N,N,N
410 POKE 53278,N:GOTO 810
500 IF Y>18 OR Y<N THEN 800
501 LOCATE X+NE,Y,DAT1:LOCATE X+TW,Y,D
AT2:IF DAT1=36 AND DAT2=37 THEN D1$=M1
$:OP$=OP1$:GOTO 900
502 IF DAT1=36 AND DAT2=63 THEN D1$=M5
$:OP$=OP3$:GOTO 900
503 IF DAT1=91 AND DAT2=63 THEN D1$=M4
$:OP$=OP2$:GOTO 900
504 IF DAT1=91 AND DAT2=37 THEN D1$=M6
$:OP$=OP4$:GOTO 900
505 IF DAT1<>36 AND DAT1<>91 THEN 800
510 RETURN
799 REM  Lose a Life
800 GOSUB 300:FOR G=FF TO N STEP -NE:F
OR W=N TO TN:SOUND N,G+W,AT,G:SOUND N,
N,N,N:NEXT W:NEXT G
810 LI=LI-NE:IF LI<=N THEN GOSUB 30000
:RUN
820 GOSUB 31000:GOSUB 3000:GOTO 50
850 POSITION 38,N:? LI:RETURN
860 RETURN
900 POSITION X,Y:? D1$:POSITION X,Y+NE
:? M2$:FOR G=NE TO TR:SOUND TW,Y,SX,FF
:NEXT G:SOUND TW,N,N,N
901 LOCATE X+NE,Y+TW,DAT1:IF DAT1<>41
THEN POSITION X+NE,Y+TW:? "├":RETURN
902 POSITION X,Y+TW:? M3$:SC=SC+FF:POS
ITION 21,N:? SC:CB=CB+NE:IF CB=CBS THE
N LEV=LEV+NE:GOSUB 7000
905 GOTO 50
999 REM  Redefine Character Set
1000 RESTORE 1004:MB=PEEK(106)-16:FOR
I=N TO 1023:POKE MB*256+I,PEEK(57344+I
):NEXT I
1001 READ I:IF I<=N THEN POKE 1720,MB:
POKE 756,PEEK(1720):GOTO 1100
1002 FOR E=N TO SV:READ B:POKE MB*256+
(AT*I)+E,B:NEXT E:GOTO 1001
1004 DATA 3,0,0,0,0,3,15,63,255
1005 DATA 4,3,15,63,255,255,255,255,25
5
1006 DATA 5,192,240,252,255,255,255,25
5,255
1007 DATA 6,0,0,0,0,192,240,252,255
1008 DATA 7,127,95,87,85,85,85,85,85
1009 DATA 8,255,255,255,255,127,95,87,
85
1010 DATA 9,85,85,85,85,85,85,85,85,10
,170,170,170,170,170,170,170,170
1011 DATA 11,255,255,255,255,254,250,2
34,170,12,254,250,234,170,170,170,170,
170
1012 DATA 13,85,21,5,1,0,0,0,0,14,85,8
5,85,85,85,21,5,1,15,170,168,160,128,0
,0,0,0
1013 DATA 1,255,255,255,255,255,255,25
5,255,26,170,170,170,170,170,168,160,1
28
1014 DATA 27,170,171,175,191,255,255,2
55,255
1015 DATA 28,170,170,170,170,170,171,1
75,191
1016 DATA 29,85,213,245,253,255,255,25
5,255,30,85,85,85,85,85,213,245,253
1017 DATA 31,213,245,253,255,255,255,2
55,255
1018 DATA 32,85,85,85,85,213,245,253,2
55,59,171,175,191,255,255,255,255,255,
60,170,170,170,170,171,175,191,255
1019 DATA 61,0,0,0,16,0,0,0,0,62,0,0,3
2,0,0,0,0,0,63,0,0,0,0,0,4,0,0
1020 DATA 64,21,69,81,84,85,85,85,85,6
5,85,85,85,85,21,69,81,84
1021 DATA 66,168,162,138,42,170,170,17
0,170,67,170,170,170,170,168,162,138,4
2
1022 DATA 70,0,0,0,0,3,15,63,252,71,3,
15,63,252,243,207,60,243,72,192,240,25
2,63,207,243,60,207
1023 DATA 73,0,0,0,0,192,240,252,63,74
,60,243,207,63,254,250,234,170,75,60,2
07,243,252,127,95,87,85
1024 DATA 76,170,170,170,170,171,175,1
91,252,77,171,175,191,252,243,207,60,2
43
1025 DATA 78,213,245,253,63,207,243,60
,207,79,85,85,85,85,213,245,253,63
1026 DATA 80,252,248,240,248,221,142,7
,11,81,11,7,142,221,248,240,248,252
1027 DATA 82,63,31,15,31,187,113,224,2
08,83,208,224,113,187,31,15,31,63
1028 DATA 84,0,0,0,0,0,24,24,0,85,0,0,
0,0,0,24,48,0,-1
1099 REM  MC For Scrolling Routine
1100 RESTORE 1110:FOR I=1570 TO 1622:R
EAD A:POKE I,A:NEXT I:A=PEEK(88)+256*P
EEK(89):B=A+(NE*40)
1102 C=INT(B/256):D=B-(C*256):POKE 153
6,D:POKE 1537,C:RETURN
1110 DATA 173,0,6,174,1,6,133,206,134,
207,162,0,160,0,177,206,141,2,6,200,17
7,206
1111 DATA 136,145,206,200,192,39,208,2
45,173,2,6,145,206,165,206,24,105,40,1
44,2
1112 DATA 230,207,133,206,232,224,45,2
08,217,104,96
2000 READ A:IF A=-NE THEN SOUND N,N,N,
N:SOUND NE,N,N,N:RETURN
2002 SOUND N,A,TN,AT:SOUND NE,A+NE,TN,
TW:FOR G=NE TO 25:NEXT G:GOTO 2000
2005 DATA 81,72,64,72,60,64,53,60,-1
2010 DATA 81,45,72,47,64,53,60,-1
2015 DATA 60,53,64,60,72,64,81,72
2020 DATA 81,72,64,72,60,64,53,60,-1
2025 DATA 81,72,64,72,81,0,60,53,47,53
,60,-1
2030 DATA 81,91,96,60,64,72,45,47,53,0
,53,47,45,72,64,60,96,91,81,-1
2035 DATA 81,64,53,45,47,60,72,81,-1
2100 FOR G=15 TO N STEP -1:FOR W=0 TO
TN:SOUND 0,W*10+G,10,G:NEXT W:SOUND 0,
0,0,0:NEXT G:RETURN
2999 REM  Draw Various Screens
3000 GRAPHICS N:POKE 710,N:GOSUB 350:P
OKE 559,46:DL=PEEK(560)+256*PEEK(561)+
FR:POKE DL-NE,70:POKE DL+TW,SX
3001 FOR G=TR TO 23:POKE VS,N
3002 POKE DL+G,FR:NEXT G:POKE DL+24,SX
:POKE 756,PEEK(1720):POKE 752,NE:CB=N:
POKE 711,52
3003 POSITION N,N:? "SCORE             LI
VES0000→→→→→→→→→→→→003":POKE 752,NE
3004 POSITION 21,N:? SC:GOSUB 850
3009 FOR G=NE TO 25:Q=INT(RND(N)*40):W
=INT(RND(N)*20):POSITION Q,NE+W:? CHR$
(93+(RND(N)*TW));:NEXT G:POKE 764,255
3010 POSITION N,NE:ON LEV GOSUB 3050,4
050,5050,6050,6250,6350,6450,6550:GOTO
 50
```

```
3050 POKE 708,TM:POKE 709,14:POKE 710,
132:? "}→→→→→→→→→→→→→#$%&"
3052 ? "}→→→→→→→→→→→→→'(+,"
3053 ? "}→→→→→→→→→→→→→))**"
3054 ? "}→→→→→→→→→→→#$?@\[%&"
3055 ? "}→→→→→→→→→→→'(+,'(+,"
3056 ? "}→→→→→→→→→→→))**))**"
3057 ? "}→→→→→→→→→#$?@\[?@\[%&"
3058 ? "}→→→→→→→→→'(+,'(+,'(+,"
3059 ? "}→→→→→→→→→))**))**))**"
3060 ? "}→→→→→→→#$?@\[?@\[?@\[%&"
3061 ? "}→→→→→→→'(+,'(+,'(+,'(+,"
3062 ? "}→→→→→→→))**))**))**))**"
3063 ? "}→→→→→#$?@\[?@\[?@\[?@\[%&"
3064 ? "}→→→→→'(+,'(+,'(+,'(+,'(+,"
3065 ? "}→→→→→))**))**))**))**))**"
3066 ? "}→→#$?@▄▀▀\[?@\[?@\[?@\[%&"
3067 ? "}→→'(+,▐▌▀'(+,'(+,'(+,'(+,"
3068 ? "}→→))**♥┣ ▐))**))**))**))**"
3069 ? "}  -.:/-.:/-.:/-.:/-.:/-.:/"
3999 CBS=20:X=13:Y=16:OP$=OP2$:EX=17:E
Y=16:RETURN
4050 POKE 710,24:POKE 708,114:POKE 709
,126:? "}→→→→→→→→→→→→→#$%&"
4052 ? "}→→→→→→→→→→→→→'(+,"
4053 ? "}→→→→→→→→→→→→→))**"
4054 ? "}→→→→→→→→→→→#$?@\[%&"
4055 ? "}→→→→→→→→→→→'(+,'(+,"
4056 ? "}→→→→→→→→→→→))**))**"
4057 ? "}→→→→→→→→→#$?@:/-.\[%&"
4058 ? "}→→→→→→→→→'(+,→→→→'(+,"
4059 ? "}→→→→→→→→→))**→→→→))**"
4060 ? "}→→→→→→→#$?@:/→→→→-.\[%&"
4061 ? "}→→→→→→→'(+,→→→→→→→→'(+,"
4062 ? "}→→→→→→→))**→→→→→→→→))**"
4063 ? "}→→→→→#$?@\[%&#$%&#$?@\[%&"
4064 ? "}→→→→→'(+,'(+,'(+,'(+,'(+,"
4065 ? "}→→→→→))**))**))**))**))**"
4066 ? "}→→#$?@▄▀▀\[?@\[?@\[?@\[%&"
4067 ? "}→→'(+,▐▌▀'(+,'(+,'(+,'(+,"
4068 ? "}→→))**♥┣ ▐))**))**))**))**"
4069 ? "}→→-.:/-.:/-.:/-.:/-.:/-.:/"
4999 CBS=17:X=13:Y=16:OP$=OP2$:RETURN
5050 POKE 710,40:POKE 708,194:POKE 709
,206:? "}→→→→→→→→→→→→→#$%&"
5052 ? "}→→→→→→→→→→→→→'(+,"
5053 ? "}→→→→→→→→→→→→→))**"
5054 ? "}→→→→→→→→→→→#$?@\[%&"
5055 ? "}→→→→→→→→→→→'(+,'(+,"
5056 ? "}→→→→→→→→→→→))**))**"
5057 ? "}→→→→→→→→→#$?@:/-.\[%&"
5058 ? "}→→→→→→→→→'(+,→→→→'(+,"
5059 ? "}→→→→→→→→→))**→→→→))**"
5060 ? "}→→→→→→→#$?@:/→→→→-.\[%&"
5061 ? "}→→→→→→→'(+,→→→→→→→→'(+,"
5062 ? "}→→→→→→→))**→→→→→→→→))**"
5063 ? "}→→→→→#$?@\[%&→→→→#$?@\[%&"
5064 ? "}→→→→→'(+,'(+,→→→→'(+,'(+,"
5065 ? "}→→→→→))**))**→→→→))**))**"
5066 ? "}→→→→→-.▄▀▀\[%&#$?@\[?@:/"
5067 ? "}→→→→→→→▐▌▀'(+,'(+,'(+,"
5068 ? "}→→→→→→→♥┣ ▐))**))**))**"
5069 ? "}→→→→→→→-.:/-.:/-.:/-.:/"
5100 CBS=14:X=13:Y=16:OP$=OP2$:RETURN
6050 POKE 710,168:POKE 708,50:POKE 709
,62:? "}→→→→→→→→→→→→→#$%&"
6052 ? "}→→→→→→→→→→→→→'(+,"
6053 ? "}→→→→→→→→→→→→→))**"
6054 ? "}→→→→→→→→→→→#$?@\[%&"
6055 ? "}→→→→→→→→→→→'(+,'(+,"
6056 ? "}→→→→→→→→→→→))**))**"
6057 ? "}→→→→→#$%&#$?@:/-.\[%&#$%&"
6058 ? "}→→→→→'(+,'(+,→→→→'(+,'(+,"
6059 ? "}→→→→→))**))**→→→→))**))**"
6060 ? "}→→→#$?@\[?@:/→→→→-.\[?@\[%&"
6061 ? "}→→→'(+,'(+,→→→→→→→→'(+,'(+,"
6062 ? "}→→→))**))**→→→→→→→→))**))**"
6063 ? "}→→→-.:/-.\[%&#$%&#$?@:/-.:/"
6064 ? "}→→→→→→→→→'(+,'(+,'(+,"
6065 ? "}→→→→→→→→→))**))**))**"
6066 ? "}→→→→→→→→→-.▄▀▀\[?@:/"
6067 ? "}→→→→→→→→→→→▐▌▀'(+,"
6068 ? "}→→→→→→→→→→→♥┣ ▐))**"
6069 ? "}→→→→→→→→→→→-.:/-.:/"
6100 CBS=FF:X=17:Y=16:OP$=OP2$:RETURN
6250 POKE 710,AT:POKE 708,130:POKE 709
,142:? "}→→→→→→→→→→→→→#$%&"
6252 ? "}→→→→→→→→→→→→→'(+,"
6253 ? "}→→→→→→→→→→→→→))**"
6254 ? "}→→#$%&→→→→#$?@\[%&     #$%&"
6255 ? "}→→'(+,→→→→'(+,'(+,     '(+,"
6256 ? "}→→))**→→→→))**))**     ))**"
6257 ? "}→→-.\[%&#$?@\[?@\[%&#$?@:/"
6258 ? "}→→→→'(+,'(+,'(+,'(+,'(+,"
6259 ? "}→→→→→))**))**))**))**))**"
6260 ? "}→→#$?@\[?@:/-.:/-.\[?@\[%&"
6261 ? "}→→'(+,'(+,→→→→→→→→'(+,'(+,"
6262 ? "}→→))**))**→→→→→→→→))**))**"
6263 ? "}→→-.\[?@\[%&#$%&#$?@\[?@:/"
6264 ? "}→→→→'(+,'(+,'(+,'(+,'(+,"
6265 ? "}→→→→→))**))**))**))**))**"
6266 ? "}→→→→-.:/-.▄▀▀\[?@:/-.:/"
6267 ? "}→→→→→→→→→→→▐▌▀'(+,"
6268 ? "}→→→→→→→→→→→♥┣ ▐))**"
6269 ? "}→→→→→→→→→→→-.:/-.:/"
6270 CBS=20:X=17:Y=16:OP$=OP2$:RETURN
6350 POKE 710,72:POKE 708,82:POKE 709,
94:? "}→→→#$%&     →→→→     #$%&"
6352 ? "}→→→→'(+,     →→→→→     '(+,"
6353 ? "}→→→→→))**     →→→→→     ))**"
6354 ? "}→→#$?@\[%&#$%&#$%&#$?@\[%&"
6355 ? "}→→'(+,'(+,'(+,'(+,'(+,'(+,"
6356 ? "}→→))**))**))**))**))**))**"
6357 ? "}→→-.\[?@\[?@:/-.\[?@\[?@:/"
6358 ? "}→→→→'(+,'(+,     '(+,'(+,"
6359 ? "}→→→→→))**))**     ))**))**"
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
0	19928	1	16986	2	16876
3	14988	4	16431	5	8182
6	7991	7	6938	8	10161
9	12269	10	5879	49	14045
50	8824	51	1432	52	1611
53	2218	54	8877	55	8901
56	8861	57	8842	70	1424
80	9645	89	13996	90	3667
95	18159	96	1430	100	8181
110	3689	111	18591	115	1433
120	8142	275	15071	300	8397
350	18977	400	20544	401	3083
405	15325	406	5784	410	3842
500	4417	501	16716	502	9690
503	9706	504	9730	505	6097
510	1498	799	8512	800	17624
810	7455	820	5518	850	5263
860	1498	900	19469	901	13521
902	18746	905	1424	999	15959
1000	14569	1001	11517	1002	10988
1004	4027	1005	5474	1006	6014
1007	4664	1008	4951	1009	5619
1010	10023	1011	11369	1012	11507
1013	11213	1014	6259	1015	6202
1016	10539	1017	6232	1018	15942
1019	9217	1020	9093	1021	10999
1022	13459	1023	14302	1024	11178
1025	10292	1026	10373	1027	9978
1028	7435	1099	17279	1100	16035
1102	10149	1110	11360	1111	11416
1112	7020	2000	11397	2002	13323
2005	4842	2010	4463	2015	4496
2020	4842	2025	6150	2030	9719
2035	4869	2100	16639	2999	14900
3000	18696	3001	4742	3002	15261
3003	18660	3004	5524	3009	20061
3010	12871	3050	8834	3052	2652
3053	2655	3054	3382	3055	2968
3056	2964	3057	4035	3058	3323
3059	3327	3060	4897	3061	3577
3062	3574	3063	5633	3064	3995
3065	3995	3066	7265	3067	5785
3068	3657	3069	4785	3999	9251
4050	9256	4052	2652	4053	2655
4054	3382	4055	2968	4056	2964
4057	3649	4058	3190	4059	3191
4060	4092	4061	3351	4062	3352
4063	4729	4064	3995	4065	3995
4066	7265	4067	5785	4068	3657
4069	4782	4999	6694	5050	9279
5052	2652	5053	2655	5054	3382
5055	2968	5056	2964	5057	3649
5058	3190	5059	3191	5060	4092
5061	3351	5062	3352	5063	4660
5064	3862	5065	3859	5066	6204
5067	5150	5068	3016	5069	3907
5100	6688	6050	8859	6052	2652
6053	2655	6054	3382	6055	2968
6056	2964	6057	4213	6058	3862
6059	3859	6060	5503	6061	3986
6062	3993	6063	5036	6064	3323
6065	3327	6066	4876	6067	4091

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
6068	2566	6069	3118	6100	6753
6250	9315	6252	2652	6253	2655
6254	4239	6255	3953	6256	3955
6257	5458	6258	3995	6259	3995
6260	5756	6261	3986	6262	3993
6263	5588	6264	3995	6265	3995
6266	5698	6267	4091	6268	2566
6269	3118	6270	6689	6350	9348
6352	3615	6353	3611	6354	4752
6355	4212	6356	4215	6357	6106
6358	3875	6359	3872	6360	5786
6361	4212	6362	4215	6363	5720
6364	3750	6365	3749	6366	6124
6367	5335	6368	3817	6369	4782
6370	6706	6450	10160	6452	3615
6453	3611	6454	4640	6455	4002
6456	4009	6457	4980	6458	3214
6459	3671	6460	4882	6461	4212
6462	4215	6463	5720	6464	3750
6465	3749	6466	5788	6467	5090
6468	3571	6469	4357	6470	6694
6550	9474	6552	3995	6553	3995
6554	5517	6555	3885	6556	3884
6557	4945	6558	3774	6559	3768
6560	4787	6561	3489	6562	3483
6563	4795	6564	3892	6565	3884
6566	6214	6567	5112	6568	3583
6569	4364	6570	6696	7000	19411
7001	14197	7003	3806	9999	10634
10000	11485	10001	7944	10002	7954
10004	5530	10005	16461	10006	2348
10007	6375	10008	7048	10009	8685
10010	15008	10011	15055	10012	14419
10013	14348	10014	4750	10015	4766
10099	9651	10100	17695	10101	16634
10120	5286	10121	5404	10122	5080
10123	5148	10124	9263	10125	5863
10126	4779	10127	11843	10128	6590
10129	5623	10130	5407	10131	5622
10132	5956	10133	5370	10134	4477
10135	5467	10136	8669	10137	6100
10138	8406	10139	6856	10140	5913
10141	2539	10150	9312	10151	12364
10200	11837	10205	13420	10220	9272
10221	5439	10222	5781	10223	6131
10224	8450	10225	3160	10319	9977
10320	8187	10321	9829	10322	10234
10323	10239	10324	10140	10325	8791
10326	9280	10327	9342	10328	7323
10329	7516	10330	8515	10331	7475
10332	7818	10333	8876	10334	9288
10335	9758	10336	9962	10337	11348
10338	10316	10339	8534	10340	4718
10341	5576	10350	9312	10351	16379
10400	1904	10500	9341	19999	10817
20000	10677	20005	7483	20006	14476
29999	15888	30000	18104	30001	15322
30002	19972	30003	14642	30005	8803
30010	19146	30011	19781	30012	5296
30998	28319	30999	23103	31000	20193
31001	4102				

→

```
6360 ? "}}}}#$?@\[?@\[%&#$?@\[?@\[%&"
6361 ? "}}}'(+,'(+,'(+,'(+,'(+,'(+,"
6362 ? "}}})))**))**))**))**))**))**"
6363 ? "}}}-.\[?@:/-.\[?@:/-.\[?@:/"
6364 ? "}}}}}'(+,     '(+,     '(+,"
6365 ? "}}}}}))**     ))**     ))**"
6366 ? "}}}#$?@\[%&/▲▼\[%&#$?@\[%&"
6367 ? "}}}'(+,'(+,▙▜'(+,'(+,'(+,"
6368 ? "}}}))**))**♥┣ ▷))**))**))**"
6369 ? "}}}-.:/-.:/-.:/-.:/-.:/-.:/"
6370 CB5=26:X=17:Y=16:OP$=OP3$:RETURN
6450 POKE 710,120:POKE 708,210:POKE 70
9,222:? "}}}}}#$%&              #$%&"
6452 ? "}}}}}'(+,     }}}}}   '(+,"
6453 ? "}}}}}))**     }}}}}   ))**"
6454 ? "}}}#$?@\[%&   }}}}} #$?@\[%&"
6455 ? "}}}'(+,'(+,     }   '(+,'(+,"
6456 ? "}}}))**))**     }   ))**))**"
6457 ? "}}}-.:/-.\[%&     #$?@:/-.:/"
6458 ? "}}}}}     '(+,     '(+,"
6459 ? "}}}}}     ))**     ))**     "
6460 ? "}}}#$%&#$?@\[%&#$?@\[%&#$%&"
6461 ? "}}}'(+,'(+,'(+,'(+,'(+,'(+,"
6462 ? "}}}))**))**))**))**))**))**"
6463 ? "}}}-.\[?@:/-.\[?@:/-.\[?@:/"
6464 ? "}}}}}'(+,     '(+,     '(+,"
6465 ? "}}}}}))**     ))**     ))**"
6466 ? "}}}#$?@:/   /▲▼\[%&   -.\[%&"
6467 ? "}}}'(+,     ▙▜'(+,     '(+,"
6468 ? "}}}))**     ♥┣ ▷))**     ))**"
6469 ? "}}}-.:/     -.:/-.:/     -.:/"
6470 CB5=20:X=17:Y=16:OP$=OP3$:RETURN
6550 POKE 710,40:POKE 708,18:POKE 709,
30:? "}}}}}#$%&#$%&#$%&#$%&#$%&#$%&"
6552 ? "}}}}}'(+,'(+,'(+,'(+,'(+,'(+,"
6553 ? "}}}}}))**))**))**))**))**))**"
6554 ? "}}}   -.\[?@:/-.\[?@:/-.\[%&"
6555 ? "}}}     '(+,     '(+,     '(+,"
6556 ? "}}}     ))**     ))**     ))**"
6557 ? "}}}     -.\[%&  -.\[%&#$?@:/"
6558 ? "}}}}}     '(+,     '(+,'(+,"
6559 ? "}}}}}     ))**     ))**))**"
6560 ? "}}}     #$?@\[%&  -.\[?@:/"
6561 ? "}}}     '(+,'(+,     '(+,"
6562 ? "}}}     ))**))**     ))**"
6563 ? "}}}  #$?@:/-.\[%&#$?@\[%&"
6564 ? "}}}}}'(+,     '(+,'(+,'(+,"
6565 ? "}}}}}))**     ))**))**))**"
6566 ? "}}}   -.\[%&/▲▼\[?@:/-.\[%&"
6567 ? "}}}     '(+,▙▜'(+,     '(+,"
6568 ? "}}}     ))**♥┣ ▷))**     ))**"
6569 ? "}}}     -.:/-.:/-.:/     -.:/"
6570 CB5=21:X=17:Y=16:OP$=OP3$:RETURN
7000 GOSUB 300:FOR G=1 TO 50:NEXT G:RE
STORE 2015:GOSUB 2000:IF LEV=NI THEN L
EV=NE:IF SP<AT THEN SP=SP+NE
7001 GOSUB 31000:COLOR 32:FOR G=N TO 3
2:X=USR(1570):PLOT N,NE:DRAWTO N,23:NE
XT G
7003 GOSUB 30000:GOTO 3000
9999 REM  MC For Sprites
10000 RESTORE 10010:FOR I=NE TO TN*TN:
READ E:PMV$(I)=CHR$(E):NEXT I
10001 FOR I=NE TO AT:READ E:P0$(I)=CHR
$(E):NEXT I
10002 FOR I=NE TO AT:READ E:P2$(I)=CHR
$(E):NEXT I
10004 PLB=PEEK(106)-8:POKE 54279,PLB
10005 PLM=PLB*256:PLM0=ADR(P0$):POKE 5
3277,TR:POKE 704,222:POKE 705,46:POKE
```




```
623,NE:POKE 53278,N
10006 PLM1=ADR(P2$)
10007 XMIS=50:YMIS=40:AMIS=100:BMIS=16
10008 E=USR(MV,N,PLM,PLM0,XMIS,YMIS,AT
)
10009 E=USR(MV,NE,PLM,PLM1,AMIS,BMIS,A
T):RETURN
10010 DATA 216,104,104,104,133,213,104
,24,105,2,133,206,104,133,205,104,133,
204,104,133,203,104,104,133,208
10011 DATA 104,104,133,209,104,104,24,
101,209,133,207,166,213,240,16,165,205
,24,105,128,133,205,165,206,105
10012 DATA 0,133,206,202,208,240,160,0
,162,0,196,209,144,19,196,207,176,15,1
32,212,138,168,177,203,164
10013 DATA 212,145,205,232,169,0,240,4
,169,0,145,205,200,192,128,208,224,166
,213,165,208,157,0,208,96
10014 DATA 28,62,124,120,124,62,28,0
10015 DATA 0,56,124,254,254,238,68,0
10099 REM  Title Screen
10100 GRAPHICS N:POKE 559,N:GOSUB 3100
0:GOSUB 350:POKE 710,N:POKE 709,14:POK
```



```
E 756,PEEK(1720):POKE 82,N
10101 POKE 752,NE:? :POSITION N,N:V5=5
4277:DL=PEEK(560)+256*PEEK(561):POKE D
L+27,2+32:POKE DL+27,34
10120 ? "#$%&    ]      _    &    ^    _
^      ]    "
10121 ? "'(+, ]  _              ▙
     _        "
10122 ? "))**  ^ #$!!%&    !  _        ^
     ]    "
10123 ? "-.\[%&  !!▒▒&] # !!%& #$%&_#$
%&"
10124 ? "] '(+, ^!!_ !  ! !▒▒! ▒▒▒ ▒!
▒▒  _  "
10125 ? "  ))**  !!  !  ! !  ! !▒▒  ▒▒
%&  #$%&"
10126 ? "#$?@:/] !!  !%$!^!%$! !%&# %$
!!  '(+,"
10127 ? "'(+,_  ]!!%&▒▒▒ ▒!▒▒ ▒▒▒^▒▒
▒▒ ^))**"
10128 ? "))**    ▒▒!!▒▒ _        ^   ]
 #$?@:/"
10129 ? "-.\[%&#$%& ^     ▒  %& $ _^
 ^'(+,"
10130 ? "^ '(+,'(+,     ^ $  !!%!      ^
 ))** ^  "
10131 ? "  ))**))**         !  !▒▒!
#$?@\[%&"
10132 ? "  -.:/-.:/  _    ▒  ▒  ▒ ^
'(+,'(+,"
10133 ? " ^                  _^]_  _
))**))**"
10134 ? "       #$!!%&
-.:/-.:/"
10135 ? "       !!▒▒▒ $!%& #$%% #$%& #
$%&"
10136 ? " ^     ▒▒!!%& !▒▒!^!▒▒! !!▒▒ !
▒▒▒"
10137 ? "     _  ^ ▒▒!! !%$! !%$! !!&# !
▒▒_"
10138 ? "       %&#$!! !▒▒▒ ▒▒▒▒ ▒▒▒▒ !
%&#"
10139 ? "    ^  ▒▒!!▒▒ !              ▒
▒▒▒]"
10140 ? "       ]    ^  !  BY M_A_BAXTER
  _"
10141 ? " ]        ^      ▒"
10150 POSITION N,22:? "        PRESS S
TART TO PLAY GAME"
10151 POSITION N,23:? "     PRESS OPTI
ON FOR INSTRUCTIONS";:POKE 559,46
10200 POKE 77,N:FOR G=N TO 5V:POKE V5,
G:Z=SIN(G):NEXT G:GOSUB 10220
10205 FOR G=5V TO N STEP -NE:POKE V5,G
:Z=SIN(G):NEXT G:GOSUB 10220:GOTO 1020
0
10220 FOR G=1 TO 100:Z=PEEK(53279):IF
Z=5X THEN GO TO TN
10221 IF PEEK(644)=N THEN GO TO TN
10222 IF PEEK(5T)<>FF THEN GO TO TN
10223 IF Z=TR AND  NOT NXPRG THEN 1032
0
10224 IF Z=TR AND NXPRG THEN POKE 764,
12:GOTO 10500
10225 NEXT G:RETURN
10319 REM  Instructions
10320 POSITION N,N:? "#$%&    ]      _
     ^    _ ^     ]    "
10321 ? "'(+, The object of the game i
s to draw "
10322 ? "))** lines around the Space C
ubes by  "
10323 ? "-.\[%& moving your marker aro
und the"
10324 ? "] '(+, various shapes you enc
ountere"
10325 ? "  ))**  Trying to stop you ar
```

```
e   #$%&"
10326 ? "#$?@:/] the radioactive mutan
t   '(+,"
10327 ? "'(+,_ Pacmen who like the cub
es  ))**"
10328 ? "))**  the way they are•   ]
  #$?@:/"
10329 ? "-.\[%&#$%& Each time you cove
r '(+,"
10330 ? "^ '(+,'(+, a shape▪you move t
o ))** ^  "
10331 ? "  ))**))**  another▪ harder
#$?@\[%&"
10332 ? "  -.:/-.:/  shape until you
'(+,'(+,"
10333 ? "reach screen 8▪then the pace
))**))**"
10334 ? "speeds up• Be careful when
-.:/-.:/"
10335 ? "approaching the top of the sh
ape▪"
10336 ? "as the Pacmen enter play from
 here•"
10337 ? "Press any key to pause the ga
me during"
10338 ? "play to take a break•A good s
core is"
10339 ? "about 10000•Move Joystick_+
 ] ]"
10340 ? "      ]   ^          - -   ┌+
  _"
10341 ? "  ]      ^                 ]":
POKE VS,N
10350 POSITION N,22:? "         PRESS S
TART TO PLAY GAME"
10351 POSITION N,23:? "     PRESS OPTI
ON TO EXIT PROGRAMME";:FOR G=1 TO 100:
NEXT G:NXPRG=NE
10400 GOTO 10200
10500 GRAPHICS N:? "Thanks for Playing
!":? :END
19999 REM  Pause Routine
20000 GOSUB 300:POSITION AT,22:? "PAUS
E":POKE 764,255:GOSUB 2100
20005 IF PEEK(764)=255 THEN POKE 77,N:
GOTO 20005
20006 POKE 764,255:POSITION AT,22:? "
     ":GOTO 50:REM  6 SPACES
29999 REM  Screen & Level Display
30000 GRAPHICS 18:GOSUB 350:POKE 559,4
6:GOSUB 860:DL=PEEK(560)+256*PEEK(561)
+FR:POKE 709,N:POKE DL+FR,39
30001 POKE DL+FR,39:GOSUB 31000:POKE 7
08,N:POKE DL-NE,64+SX:POKE DL+TW,SX:GO
SUB 30998
30002 IF LI=N THEN POSITION FV,TR:? #5
X;"GAME  OVER":Z=2030:POSITION FV,SX:?
 #5X;"PLYR #1":SP=SX:GOTO 30005
30003 POSITION FV,TR:? #5X;"SCREEN #";
LEV:Z=2010:POSITION FV,5X:? #5X;"level
"
30005 FOR G=N TO FF:POKE VS,G:NEXT G:P
OKE 708,14:CB=N
30010 POKE 708,14:FOR G=1 TO 50:NEXT G
:FOR G=FF TO N STEP -NE:POKE VS,G:POKE
 709,15-G:NEXT G:RESTORE (Z)
30011 POSITION 11,6:? #6;SP-FV:GOSUB 2
000:POSITION 11,5X:? #6;"  ":FOR G=N T
O FF:POKE VS,G:POKE 709,FF-G:NEXT G
30012 FOR G=1 TO 25:NEXT G:RETURN
30998 POSITION N,N:? #5X;"SCORE
     LIVES":REM  11 Spaces inverse
30999 POSITION N,NE:? #5X;"00000
      000":POSITION NE,NE:? #5X;SC;" ":
POSITION 18,NE:? #5X;LI;:RETURN :REM 1
1 Spc
31000 AMIS=FV:BMIS=101:XMIS=220:XMIS=1
6:E=USR(MV,N,PLM,PLM0,XMIS,YMIS,AT):E=
USR(MV,NE,PLM,PLM1,AMIS,BMIS,AT)
31001 POKE 53278,N:RETURN
```



Tired of typing?
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HARDWARE REFLECT by PAUL FARNFIELD

THIS is a rather neat demonstration one of the Atari's least used features, the hardware reflect facility. The program is written in Basic, but there is a small machine code interrupt service routine which is used to turn the reflect register on during the lower portion of the screen only. This program could have been written in three lines, but the five line limit has allowed a much clearer approach.

Line 10 sets up the screen mode and colour, and the start of the display list.

Line 20 loads the machine code routine into Page 6.

Line 30 tells the operating system where to find the interrupt routine. It also enables the DLI's and sets up the custom Display List.

Line 40 simply positions and prints out the text.

Line 50 just loops around to stop the display from being cleared.

```
10 GRAPHICS 18:POKE 710,0:D=PEEK(560)+
256*PEEK(561)
20 FOR W=1 TO 11:READ B:POKE 1535+W,B:
NEXT W:DATA 72,169,4,141,10,212,141,1,
212,104,64
30 POKE 512,0:POKE 513,6:POKE 54286,19
2:POKE D+6,2:POKE D+12,135:POKE D+13,6
40 POSITION 15,1:? #6;"DLI REFLECT":PO
SITION 2,8:? #6;"by paul farnfield":PO
SITION 2,9:? #6;"BY PAUL FARNFIELD"
50 GOTO 50
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	8576	20	14018	30	12907
40	29260	50	1424		

CURSOR HIGHLIGHT from TIM BAILEY

HAVE you ever been de-bugging a program or editing a screenful of text and wished the cursor was a little bit easier to see, or even wished you could find out which line it is on?

Well this program solves both problems. It is written in machine code, and resides in page 6 of memory. Its function is to highlight the line that the cursor is currently on. It also flashes the cursor, and any inverse video characters that are on screen.

The program sets up a display list interrupt on one of the blank lines at the beginning of the display list. The program calculates where the cursor is with respect to the scan lines of the TV display by checking VCOUNT (54283, the scan line counter), and at the appropriate time changes the colour of that line.

Next it delays long enough to cover eight scan lines – equal to one graphic mode 0 line – and then restores the original colour and returns from the interrupt. The flashing cursor is operated from the vertical blank interrupt, which operates 50 times a second.

If you wish to save or load programs while this routine is running first POKE 54286,64 to turn the display list interrupt off. If you do not, some errors will result in the serial port input/output routines.

On completion of SAVE/LOAD operations POKE 54286,192 to restore program operation. Note the cursor will still flash, but the coloured line will disappear when POKE 54286,64 is used.

After the program is typed in save it before running it. If all is well you will see a dark red line across the screen on the same line as the cursor and the cursor will be flashing. You may type NEW to clear the program memory as the routine sits in page 6, safe from Basic.

If you press System Reset, or call a new graphics mode, the line will disappear. You may restore the function of the routine by typing X=USR(1536).

```
1 FOR I=1536 TO 1536+128:READ A:POKE I
,A:NEXT I:X=USR(1536):REM LINE HIGHLIG
HTER T.G.BAILEY 1986
2 DATA 104,169,46,141,0,2,169,6,141,1,
2,173,48,2,141,32,6,141,35,6,173,49,2,
141,33,6,141,36,6,169,128,13,32,6,141
3 DATA 32,156,169,192,141,14,212,32,83
,6,96,72,138,72,24,165,84,105,4,42,42,
162,20,205,11,212,208,251,142,24,208
4 DATA 105,2,205,11,212,16,251,173,198
,2,141,24,208,104,170,104,64,169,7,160
,92,162,6,76,92,228,206,128,6,48,3,76
5 DATA 98,228,173,243,2,201,1,208,13,1
69,2,141,243,2,169,12,141,128,6,76,98,
228,169,1,141,243,2,76,112,6,11
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	30424	2	16609	3	16466
4	16598	5	15798		

Five liners

COLOUR ROTATION from D. ROBSON

THIS program draws a pattern in Graphics 10, and then rotates the colours with a small machine code routine.

The colours are rotated by cycling the shadow colour registers 705 to 712, and this method could be used for animation in other programs too.

Line 10 contains a TRAP statement to re-run the program when all the colours have been used. Graphics 42 is used instead of a plain Graphics 10 in order to retain the pattern on the screen.

POKE 559,0 turns the display off to speed up the screen update. POKE 559,34 (line 20) turns it back on again.

Line 20 POKEs the machine code data on the first run, and also POKEs in the different colours as the program needs them.

Line 30 simply contains the machine code data.

Line 40 draws the actual pattern on the screen.

Line 50 handles the colour rotation via a USR call. Variable T is used to slow down the colour change, but the value 22 could be reduced to speed up the effect.

Some of the lines are very long, and you will need to use abbreviations to type them in – for example, use GR.42 instead of GRAPHICS 42.

VARIABLES

C	Colour being used (1-16).
R	Has program been run before? (1=Yes, 0=No).
T	Delay timing loop.
A	Data being read in.
L	Line being drawn.

```
10 TRAP 10:GRAPHICS 42:POKE 559,0:C=2:
DATA 0,2,4,6,8,10,12,14
20 RESTORE 1:FOR X=705 TO 712:READ A:P
OKE X,(C*16)+A:NEXT X:POKE 559,34:IF R
=0 THEN FOR X=1536 TO 1562:READ A:POKE
 X,A:NEXT X:GOTO 40
30 GOTO 50:DATA 104,162,0,172,193,2,18
9,194,2,157,193,2,232,224,8,144,245,14
0,200,2,96,65,65,65,65,65,65
40 FOR Z=1 TO 10:FOR X=1 TO 8:COLOR X:
PLOT 0+L,0+L:DRAWTO 79-L,0+L:DRAWTO 79
-L,191-L:DRAWTO 0+L,191-L:DRAWTO 0+L,0
+L:L=L+1:NEXT X:NEXT Z
50 FOR E=1 TO 31:X=USR(1536):FOR T=1 T
0 22:NEXT T:NEXT E:C=C+1:R=1:GOTO 20
```

Get it right!

LINE CHSUM	LINE CHSUM	LINE CHSUM
10 10251	20 10761	

MAKING THE RIGHT CONNECTIONS

I HAVE just finished reading your excellent article on gadgets in the July issue of Atari User.

I was just a little concerned about the author's recommendation to use a battery charger for supplying the 12 volts DC required to run the unit.

From my point of view it would be no problem as I have worked in electronics for nearly 30 years, but for the novice it could have potentially disastrous results.

The reason for this is that the standard car battery charger has no smoothing and thus delivers 13.8 volts raw DC at 100Hz. This will almost certainly destroy any semiconductors used.

I would recommend a smoothing condenser of between 1000 and 3500 UF rated at about 25 volts WKG electrolytic be connected across the supply rails, or that a car battery be used as a reservoir. – **R.C. Gornall, St Leonards-on-Sea, East Sussex.**

Printer switches

I HAVE an Atari 800XL with an 810 disc drive connected through an 850 interface and a Taxan Kaga KP-810 dot matrix printer attached.

Can you please tell me what I should set the dip switches to on the printer?

I have tried various combinations but still have trouble getting even simple things like lines to print properly. – **K. Hitchings, Winchester, Hampshire.**

● The most important DIP switch to set is the auto-linefeed, which should be set to ON. Other than that, select UK character set, 11 inch paper, and any other values to suit yourself.

If you have any further problems, contact the dealer who sold you the printer.

Pros and cons of Logo

COULD you please explain what the advantages and disadvantages of Logo are? I only know that it is a language. Can Logo be used on my 800XL? Also, is machine code a hard as everyone says it is to learn?

I bought my Atari at Christmas and so far I am quite satisfied. I have only one complaint. Why do cassettes take so long to load.

I have Mr Do which takes 15 minutes and Spy V Spy 2 which takes 18 minutes.

Most of my friends have Spectrums or Commodore 64s and their games take about 3-5 minutes to load.

Is there any way to shorten this loading time – except by buying a disc drive as I don't have enough money? – **Julian Turner, Weston-Super-Mare, Avon.**

● Logo started life as an educational language. It is very good for use with children, as you write the programs in English and further words can be defined and saved as you go along. However, it is not really suitable as an language to go on to after Basic – for that, something like machine code may be more appropriate.

Machine code does take a bit of learning, although once you have got the hang of it it all makes a lot of sense.

It is very logical, but rather long-winded and also not very forgiving of little mistakes.

If you want a lot more speed and power from your computer, but feel that machine code may be beyond you at this stage, then Action! is the language for you. People who have written complete commercial packages in this very straightforward language, say it is worth every penny.

There is no easy answer to your last question, unfortunately. The Atari tape system simply can't be speeded up beyond about 900 baud without becoming very unreliable.

The only answer is to keep on saving for a disc drive or to have your recorder fitted with a hardware modification to speed it up, which may not work with some commercial programs.

Digitised snapshots

DO you know of anyone offering a service to have photographs digitised and saved onto disk? – **G. Forrester, East Kilbride, Glasgow.**

● Aside from paying out a small fortune for a ComputerEyes add-on and a video camera, does anyone know of a commercial service that can digitise photographs for Mr. Forrester?

Locking problems

IT'S that lock up bug raising its head again; readers with early model machines may find that the otherwise excellent 80 column screen program given in August's issue locks while deleting line numbers.

The answer to this one is easy – either modify the program to delete the lines given by the FOR loops in lines 1020 and 1100, in reverse order, or do it by hand.

Finally, when storing strings using PRINT the system uses long inter-record gaps when they really don't seem necessary. Is there a way of fooling the system into using short gaps, and will INPUT cope all right? – **Alan Puffett,**

→

Disc indexing and DOS

IN the April issue of Atari User *a disc index utility program was listed which promised to be an excellent utility for my recently-bought 1029 printer. All my disc files could be listed on paper in an orderly and organised manner without wasting paper.*

Yet after spending nearly an hour typing in the program and running it, I get a disc error statement after the filenames have been printed. No sign of the number of files, used sectors or free sector prompts which should appear.

Is this due to the fact that I am using DOS 2 and DOS 3 with the 800XL and 1050 drive?

Also, is there any way in which to overcome this error and get a complete printout without actually using DOS 2.5 as suggested in the article? – **Ian Williams, Carmarthen, Dyfed.**

● The program should work fine with DOS 2.0 or DOS 2.5, and we see no reason why it shouldn't work with DOS 3 also.

Check lines 230 and 290, as they are the only ones run between the file names being printed and the bottom line being started.

If you can, stick to DOS 2.0 or 2.5 rather than DOS 3 – you'll find them a lot more efficient.

Higham Ferrers, Northamptonshire.

● Thanks for the tip to help out Rev B Basic sufferers. To make the cassette system use short inter-record gaps, simply use 128 instead of 0 as the second parameter of the Basic OPEN statement.

For example, use OPEN #1,8,128,"C:" or OPEN #2,4,128,"C:".

Don't forget that you won't be able to stop/start the tape in this mode, and that Basic's GET command may be too slow to pick up some data. INPUT and PRINT should be fine, though.

You will probably find that if you PUT bytes from Basic you will also be able to GET them back again. This is because the gaps will have extended to allow for the slower PUT speed.

Colour compatibility

I PRESENTLY own an Atari 130XE computer system with a 1027 printer. While I am extremely pleased with the computer, the printer no longer meets my needs and I am therefore in the market for a new one.

I am interested in an Okidata Okimate 20 dot-matrix colour printer, but I am unsure if it is compatible with my system. Please let me know if this is suitable and if so, where I can obtain the necessary software and interfaces. – **Charles T. Miller, RAF Alconbury, Huntingdon.**

● The Okimate 20 is quite compatible with your computer – all you need to do is get a Centronics interface such as the FCC model to link it to the computer.

Be warned, though, that you won't be able to get instant full colour screen dumps. If you want them you'll have to do a good bit of programming for yourself to get them to work. Ordinary text should print with no problems.

Printer interfaces

I HAVE an Atari 130XE, an 800XL, a 1050 disc drive and a Brother M1009 printer.

I have sought advice from various sources over a long period of time as to what I need to link the computers to the printer. The advice I have been given so far has been either vague or non-existent.

The biggest disappointment was writing to FCC systems who advertise in Atari User *and from where I got the address. I asked them if their interface would work with the Brother M1009 and even enclosed an sae for their use.*

They did not even have the courtesy to reply.

All I am asking is for someone, anyone to tell me what interface I need to connect the two machines. And, if indeed an interface is available, where can I purchase one.

Can someone please give me some authorative advice? – **N.R. Fairclough, Kidderminster, Worcestershire.**

● The Brother M1009 has a

Games people play...

● Many of you have been writing in with questions on how to get through some of the tougher parts of the latest games, but unfortunately not all of our staff can afford the time to sit around all day playing games...

Oops - sorry - evaluating and play-testing multi-level entertainment software releases...

However, we've decided to let you all help each other out. If you send in your questions and queries, and also include a few tips on your own favourite titles, we'll print the best ones. Here's a selection to be going on with:

★ ★ ★

PLEASE help! I am desperate – could someone who has 'Feasibility Experiment' tell me how to get the diamonds?

I have had this game for months but cannot get them, even though I can go back to the altar and read the inscription. – **Michael Pope, Basildon, Essex.**

★ ★ ★

MY friend and I have been reading your magazine for a few months and thought your readers would be interested in hints for the following games.

Ghostbusters: to get $999,900 use no name and the code 31222646. Ghostchaser: to get extra lives and be transported to the halfway mark type Frank several times followed by Fanda – do not move while typing.

In Redmoon: if in trouble you can type the command Plant followed by the name of the object or creature, but beware for it will disappear forever. Ollies Follies: passwords in order are Frank, Fanda, Norbi, Zoom. Blue Max: be careful not to bomb your own hangar or the game will crash.

With F-15 Strike Eagle, if out of fuel keep your finger on the afterburner key to keep flying. Track and Field: in the high jump when the bar is set at 2.40m, you can go under it.

We would be interested to hear other peoples hints, particularly the passwords for Bounty Bob and Whirlinurds. – **Stephen Grieve and Mark Spray, Loughborough, Leicestershire.**

★ ★ ★

I AM seeking help on Bounty Bob Strikes Back.

Do you know how to get past the Acid Rain? I have tried many times but failed.

Also, is it possible to save the position you are at on the game as I feel like bashing my head against the wall when I run out of lives and have to start all over again. – **Stephen O'Neill, Newquay, Cornwall.**

★ ★ ★

I THOUGHT you might be interested in the following codes and warps for Bounty Bob and One Man and His Droid.

The codes for the latter are: L1. None. L2. Bubble. L3. Atari. L4. Finders. L5. Genetic. L6. Zapped. L7. Megasonic. L8. Timewarp. L9. Ectoplasm. L10. Gorgeous. L11. Seaside. L12. Gizmo. L13. King Kong. L14. Hologram. L15. Curry Rice. L16. Coffee. L17. Cassette. L18. Telescope. L19. Computer. L20. Edacraeda.

Bounty Bob special code numbers are: 5, 6, 40, 49, 69, 100, 666, 818, 1000, 2049, 782, 6861.

40 – Fills up the high score with Y YUKOH so you don't have to go through the game 10 times to see Yukoh.

100 – Gives bob a haircut.

Finally the secret warps in Bounty Bob are: L1. Pick up flower pot, press 1 and start. L5. Pick up coffee pot, press 8 and start. L2. Kill all mutants, pick up paint roller, press 3 and start.

L3. Get goblet 4 and start. L10. Get pitch fork 5 and start. L13. Get goblet 4 and start. L16. Get pie and set suction tube 1 to left 9 and start. – **James Lloyd, Rockferry.**

★ ★ ★

I AM writing to tell you how much I like your magazine and to tell everyone that Airwolf for the Atari is not really Airwolf but Blue Thunder.

It was lucky that the shop keeper said that, or I would have wasted my money. – **C. Wilson, Hillingdon, Middlesex.**

Centronics interface (the industry standard for computer to printer connection), and so the FCC Interface should work fine, and is reasonably cheap.

Paperboy for Atari?

I WOULD like to make a complaint, not to Atari User, but to the Atari software houses.

It is about the arcade game Paperboy. I think it is a disgrace that Commodore, Amstrad and Spectrum should bring out the game while Atari has not.

I was also wondering if any Atari software houses were thinking of bringing out Ghosts 'n Goblins, as I have played it in an arcade and think it is a very good game. – **S. Cartlidge, Stoke-on-Trent.**

Dumping graphics

I'VE battled through thick and thin, through sleet and snow but I still can't figure out how to dump a graphics screen from my 800XL onto my Atari 1029 printer. Is it possible? If it is can you please help! – **Jonathan Evans.**

● See our article, Screen dumps with the 1029, in the September 1985 issue. By the way, can we interest you in a thick coat and an umbrella?

Basic update

I BOUGHT my 800XL over a year ago now and it is now out of guarantee.

I recently discovered it has Rev B basic. What should I do, if anything at all, to get the updated Rev C machine?

Secondly in future issues I would like to see an occasional free gift, for example, small game on tape.

To cover its cost just for that issue you could put the price up 20 or 30 pence. I think this would please many people and increase your market. – **Steven Hall, Kidderminster, Worces.**

● If your 800XL is out of guarantee when you find out that it has Rev B Basic you can always purchase a plug-in cartridge of Rev C, which will only cost you about £9.99 from most good Atari dealers.

As to your second question – we're not entirely sure we can get away with asking people to pay an extra 30p for a free gift .

ATARI USER Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

Cavern Escape – again

FURTHER to my earlier letter about Cavern Escape I notice you have issued a correction in the August issue of Atari User and that it works without line 5508.

I have corrected all the errors to the correct Checksum but it still will not work. Please let me know where I go to from here. (Keep it clean!)

Is it possible to produce a Checksum which tells you whether the line you have typed in is correct after you have typed it in? I find Get It Right very time consuming, especially if you only have to correct lines at the end of one or two long programs. – **R.H. Marsland, Coalpit Heath, Bristol.**

● As we said in the August issue, the listing is fine with or without line 5508 – and apart from that it was printed quite correctly.

If you have now got the checksum values to match and you are still having problems, could it be related to the old Rev B (or even Rev A) bugs in Basic? Check your revision and see if that might be where your problem lies.

That XL handbook

I HAVE tried to get The XL Handbook, Century Publications, but no bookshop in Edinburgh stocks it. Could you please tell me where I should be able to get it? – **Elinor Ballard, West Lothian, Scotland.**

* * *

I AM rather new to the Atari world, and obviously new to your magazine.

On buying the Atari 800XL and tape recorder I opened the box and after frantically searching for a user manual, it was back to Dixons' Newark branch.

They said: "No, you are not supposed to get a manual, besides the reference guide", in their usual upper class voice.

Is this true? If so could you recommend a good basic book?

Also, I had problems with the graphics listings featured last month. How do you make your own creature in preference to the bug? I fiddled with the data statements but got no good results. – **Stuart Vyse, Long Bennington, Nottinghamshire.**

● You can get copies of The 130XE Handbook, which covers the 800XL as well as the 130XE, from most major Atari dealers, or by mail order from Software Express or Silica Shop if you have any problems.

As for Mr. Vyse's problem with his creature – have a look at Stephen Williamson's Player Missile article in the June 1986 issue, which featured an editor which allows you to create your own shapes.

Loading problems

ABOUT three years ago I purchased an Atari 400 and 410 recorder from Laskys.

About a year ago I discovered the computer would not cload programs. I even tried the start/on process but all this game me was BOOT ERROR.

The csave command worked well and I tried the saved programs on an 800XL and they worked.

Until I bought Magic Window from Quicksilva I had only used cartridges so I didn't discover the error.

I sent the data recorder back for repair and after waiting four months tried again. I loaded a cassette into my computer and after the whistling has finished I heard the usual beeps covered up with a horrible noise.

Error 146 etc was printed on the screen. I tried again and again but to no avail. So this time I sent the computer and recorder back. Six months elapsed and I received a postcard saying there would be a small delay.

After this postcard I rang and was told the parts were just being fitted. I waited a

month and rang again to be told the parts were just going to be fitted.

Does it really take six months to repair a small fault? I think Lasky's repair services should pull their socks up!

Also, I heard about an adventure writing program by Codewriter. Could you give me a phone number on which I could inquire? – **Stephen Beck, Hertford, Hertfordshire.**

● We're sorry to hear of your misadventures, but hope you've got a fully working machine now.

The Codewriter program is no longer available, but you could try asking round some of the mail order dealers to see if they have any left.

Games for all seasons

I HAVE just typed into my Atari 800 the modified version of Get-it-Right but keep getting error 18 at line 4310. I am unable to find an error despite checking it thoroughly.

Could you also advise me where I can obtain a 5-pin monitor lead as I wish to connect my 800XL to my video.

I have also been looking for Summer Games II and Winter games but have not been able to find them – are they around for the Atari yet?

Finally, can the Home Filing Manager still be obtained other than as a disc pack, and is the touch tablet still available? – **James R. Bloodworth, Nottingham.**

● Your problem could be caused by one of two things. The first is that you might be trying the checksum on a CSAVEd or SAVE "D:xxxx" program. Don't forget that you must use LIST format to record your program before running Get-It-Right! on it.

If that is not your problem, check over any lines that set up or use the variable LN$ are correct – especially lines 60, 4000 – 4050 and 4310.

The error is caused by trying to find a valid number in LN$ where none is present.

Most of the larger mail order firms can supply you with a lead, or alternatively you could take your copy of the March 1986 issue of *Atari User* into a local hi-fi shop and ask them if they can make up a lead as shown on page 49 for your type of video.

Summer Games II and Winter Games are not yet available, but the Touch Tablet is. As for Home Filing Manager, check around and see if you can find one.

Extending Alphacom 81

CAN somebody help me in getting my Alphacom 81 thermal printer working with any of these programs: 1. Printshop. 2. Megafont II+. 3. Typesetter. 4. Rubberstamp. 5. Printing? – **David T. Beech, Bristol.**

● Can anyone help Mr. Beech? We don't know of a driver that will allow the programs he mentions to work with an Alphacom thermal printer, but there are an awful lot of resourceful readers out there. Please let us know if anyone has managed to get any of them working.

If you are considering buying a printer do try to stick to something that is Epson RX/LX compatible, as this will save you an awful lot of headaches in the future.

Transferring programs

I HAVE a 130XE with 1050 disk drive. Please can you tell me if there is a way of transferring several programs from disc to Ramdisk from within another program?

I have tried using the Run and Save commands in the indirect mode, but of course this means that the main program is lost. I suspect that the answer is connected with Input and Print.

Also please can you review some peripherals and accessories in future issues, and another series on machine code would be appreciated. – **C.R. Goodfellow, Newbury, Berkshire.**

● All you need to do is OPEN a channel for input to the file on disc, and another for output to the ramdisc.

Then simply GET each byte from the first file and PUT it back into the second. Use a TRAP statement to detect the end-of-file error when the last byte has been read.

To transfer a file called MYPROG.DAT, you would do the following:

```
10 OPEN #1,4,0,"D1:MYPROG.DAT"
20 OPEN #2,8,0,"D8:MYPROG.DAT"
30 TRAP 60
40 GET #1,BYTE
50 PUT #2,BYTE
60 GOTO 40
70 CLOSE #2:CLOSE #1
80 END
```

You could speed this up considerably if you modified Aaron Spilling's binary-get and binary-put routine for transferring blocks of memory to and from files.

Simply read the data into a long string, then send it out to the second file. Keep doing this until the whole progam has been transferred. See the Data Editor article on Page 42.

Double sided discs

EITHER I got it wrong or my first thoughts were right and there's really something wrong with your Get-It-Right.

I've typed the program, checked and double checked it but it won't work. The problem is that it doesn't print any numbers at all.

By the way, is line 4512 IF START=0 THEN CC=1: . . . or IF START=0 THEN C=1: . . .?

I've bought four double sided, double density discs from BASF. I asked the salesman how to use the two sides of the disc and he said I should cut a notch opposite the existing one. Is this possible? Will it damage the disk drive? The disc's reference is 5.25 2D PXV. – **Joaj Paulo F. Silva, Lisboa, Portugal.**

● The line reads:
IF START=0 THEN CC=1: . . .

If you still have problems, why not get the monthly tape or disc with it on?

Cutting a notch in the other side of the disc is an accepted practice. There are arguments on both sides, but we use B-sides in the office all the time with no problems to speak of.

All you need do is mark up a hole exactly opposite the original one – use another disc as a template if you like. Then carefully cut it out with a sharp knife or scissors.

Ensure that you don't get any bits inside the sleeve, and that you don't cut into the media itself. You can even get discs pre-cut like this if you search about a bit.

Autorun for cassettes

CONGRATS on a first class magazine. I get more information out of Mailbag than most of the books I either buy or borrow. The 5-liners are very useful too.

I am writing to ask if you can tell me how to make my programs autorun. I have a 800XL with a 1010 data recorder. I have phoned up Atari Help Line and they insist that this is only possible on disc.

If this is so then how is it that some of my better games, once loading has finished, will go straight into the run mode?

Please, please will you help me solve this very frustrating problem. – **Ian James, Lewes, Sussex.**

● The Help Line was half right. It is only possible to have a program automatically run

on disc, but there is no reason why someone couldn't come up with a routine to do the same thing on cassette.

If enough people are interested we'll print one in a future issue that will allow your Basic programs to load-and-go via the normal holding down the Start key procedure.

Saving on the 800 XL

I WOULD like some information on how to save some of the programs on my Atari 800XL.

The cassette I got with my computer is a phone-mark recorder but after I have typed in a game from Atari User I cannot seem to save it.

Also, when I try to save it I have to hold down play and record as they don't stay down, and when I try to load the program back into my computer it goes in so far and then stops.

I would also like to know at the end of each program what the Get It Right in the box with line and Checksum mean. – **David Paterson, Thornton, Fife.**

● It sounds very much as though you have a faulty recorder. Try taking it back to the shop you got it from and asking them to repair or replace it.

You will probably find that you can CSAVE things correctly then.

Have you read your August issue and found out what the Get-It-Right! boxes are for yet? All is made clear there.

Swapping ideas

I OWN a 800XL and 1010,1050. I would like to swap ideas with people in Europe, especially Germany.

I have a lot of disc games and a good few cassettes. Please could you put me in touch with someone? – **Darren Scully, Dublin, Ireland.**

Colourful characters

IS there a POKE statement or something to change the sound of the cursor? If so please could you tell me how.

Also, how do you get multicoloured characters? I wish to know as I am writing my own game.

I think Atari User is a great mag, it has helped me quite a lot. – **Richard Hider, Havant, Hampshire.**

● You want POKE 731,1. This disables the key-click on XL or XE machines. POKE 731,0 to turn it back on again.

As for multicoloured characters, have another look at John White's article in the April 1986 *Atari User* on using graphics Modes 12 and 13. We think this should answer most of your questions.

Getting it right

MANY thanks for the updated version of Get It Right! I was obviously one of the lucky ones having already obtained your December 1985 and January 1986 versions, but the added printed option makes life much easier checking Checksum listing on paper as opposed to on screen.

However, I do have one problem with checking large programs on my Atari 1029 printer, in as much as I only use single sheet paper, and there is no mention in the instructions of any way of interrupting the printer while it is printing.

That is, after it has printed the next line to stop printing while I insert a new sheet of paper and then type CONT or some other command for it to continue printing. I have experimented but cannot find any combination of Escape or Control keys to assist in this task.

The other thing I thought of was to save the typed program in sections, checking each section (less than one page in length) at a time, but I am not yet experienced enough to be able to then put the sections together as one program after checking.

Finally, would it be possible to add a line or two to the Get It Right! program to count the number of lines printed while creating Checksum and then letting the program interrupt the printer while the paper is changed? – **Chris Barker, Woodley, Berkshire.**

● The following lines could be added to the Get-It-Right! listing printed in the August 1986 issue to pause the listing when you hit the spacebar.

```
4502 IF PEEK(764)<>33 THEN 4510
4504 POKE764,255
4506 IF PEEK(764)<>33 THEN 4506
4508 POKE 764,255
```

The disc may continue to turn for a few moments after you press the spacebar while the computer is working out a line, but no further lines will be printed until you hit the spacebar again.

This also applies to the screen for those who are too lazy to use two fingers to press Control+1!

Monkey Wrench II

I HAVE been using an Atari computer for about four years now. I began on an Atari 800.

After a trip to America my parents returned me a Monkey Wrench II utility cartridge. This proved to be incredibly useful.

However, when I was given my own computer, an 800XL, I found that this utility did not work. When the cartridge is inserted a blank screen is all I get, allowing no inputs or output.

Can you help? I am open to suggestions. – **D. Hauton, Carterton, Oxon.**

● As you have quite rightly said, the old Monkey Wrench cartridge will not work on XL or XE machines.

You could send to the States for an XL/XE version, but perhaps better still you might like to consider getting a copy of Basic XL or Basic XE from O.S.S.

Both feature lots of the useful features of Monkey Wrench, and might be quite a bit cheaper as they are available from UK sources such as Software Express.

Lost in Space Maze

I HAVE just typed out your Space Maze and on the first board there is a tower, but what is it for?

On Board 2 there is what I think is a fuel station, but I have not been able to get there.

On Board 3 I got through the rocks and landed on what I thought was fuel but was killed.

Could you please tell me how to get fuel? – **Carl Dickin, Preston, Lancs.**

● To refuel all you need to do is hover inside the fuel dump by giving quick bursts on the rockets until you are stationary. The fuel will then load automatically.

Screen flicker

I AM writing to ask about a problem I have with my Atari 800XL.

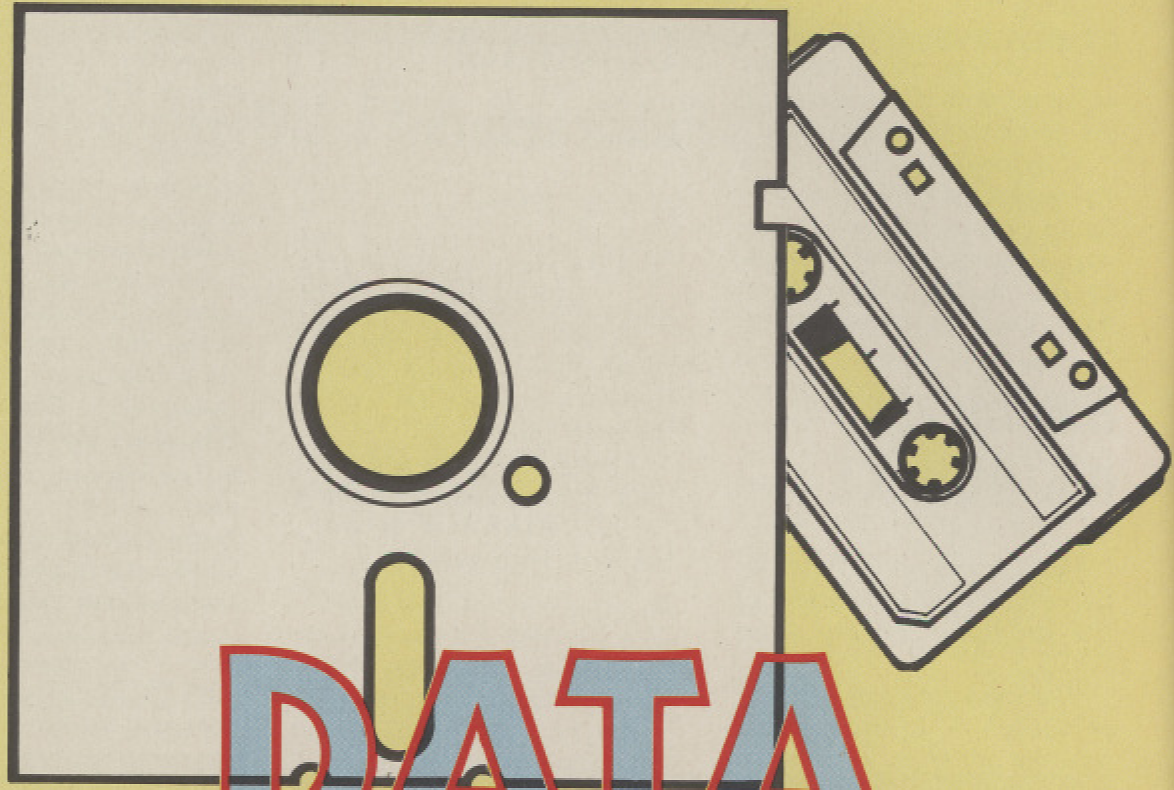
The screen display flickers and wobbles, in parts, with some games, mostly scrolling games like Boulderdash. I also have an old 400 and this is not affected. I've swapped televisions to no effect.

Can you tell me if this is a hardware defect which needs dealer attention, or might it be the modulator needs a tweak?

The 800XL is still guaranteed, but if it only needs a tweak this would save time.

I have enthusiastically bought your magazine from the start and don't remember reading of a similar fault. – **J.C. Bavey, Guisborough, Cleveland.**

● This sounds like a fault in the computer. It could be a dry joint, but to be on the safe side you should take it back to your dealer for repair.



DATA EDITOR

By AARON SPILLING

THIS program lets you edit various types of media – cassette or disc files, disc sectors and defined areas of memory. Modified data can then be stored back on any of the four media, regardless of where it originally came from.

To leave as much space as possible for the editing buffer, the program does not include many REM statements. After typing in the listing, it is possible to edit a file of up to approximately 13k. Disc and cassette subscribers will also have a compressed version which enables approximately 17.5k to be edited.

The editor is designed to accept either hexadecimal or Atascii input, which can be toggled by holding down the Option key and pressing M on the keyboard.

Other options are:

- N Goto next block
- P Goto previous block
- G Goto block number xx
- C Convert a number from hex to decimal or back again
- F Format disc
- S Save data
- A Abort

You should save the program after typing it in as if there is the slightest error in the way you have typed in the machine language data statements the computer may lock-up, losing everything that has been keyed in so far.

After typing RUN, a title screen is displayed and 'Please wait...' appears as the program goes through its initialisation routine. After about 30 seconds the main menu is displayed.

There are five options, allowing you to load the edit buffer from a cassette or disc file, disc sectors or memory, or alternatively to exit the program.

When loading from cassette the program prompts insertion of the tape and to press Start to continue or Option to abort. On Option the program returns to the main menu to allow another selection. If Start is pressed, the tape file is loaded and the editing screen appears.

Follow the same procedure for disc files, but you will obviously need to enter the filename too.

When loading from disc sectors, start by entering the first sector to load, followed by the number of sectors to load. Then, as with tape loading, press Start to continue or Option to abort the process and return to the main menu.

To load from memory, enter the starting address (in decimal, ranging from 0 to 65535), followed by the number of bytes to transfer to the buffer.

The editing screen is displayed automatically after loading. The top line shows: 'Editing block xx of yy', where xx refers to the current 128 byte block being worked on, and yy is the total number of blocks currently in the buffer.

Below this is the actual data, with hexadecimal codes on the left of the screen and Atascii text on the right. At the bottom of the screen are notes to remind you of all the available options.

Simply hold down the Option key and press the highlighted letter of the function required. For example, to move to the next screen block, hold down Option and press N.

The bottom line displays the status of the editor – hex or Atascii mode and the caps and inverse video settings. To toggle from upper-case to lower and back, press the Caps key only – neither Option nor the Shift key are necessary.

To move the cursor around the screen hold down Option – not Control – and press one of the arrow keys. You can then change the data by typing in the new information.

If editing in hex mode you may only use the 0-9 and A-F keys, and as you change the bytes the Atascii representation is automatically updated and recorded in memory.

To change between the hex and Atascii modes press Option and M. The cursor is always displayed in the hex area of the screen, but when in Atascii mode you can enter any keyboard character you like and both the text and hex codes will be updated.

There are three ways of moving on

PROGRAM DESCRIPTION

Lines	Description
30-100	Screen handling routines for printing text, centering it, drawing borders and erasing portions of the screen.
110-190	Short machine language routine to load or save data to or from a disc file. This routine can be used in your own programs and is contained in *L$*. The data for *L$* is contained in lines 3150-3160. To use this routine first Open your file then use a USR call in the form of X=USR(ADR(L$),Channel, Code [7=read, 11=write], Address of buffer, Length of buffer). When loading, set the length of buffer variable to the maximum possible number of bytes to load. The actual number of bytes loaded is returned in *X*.
200-370	Get or put disc sector routine. Again this can be used in your own programs and is contained in *CIO$*, the data for which is in line 3170. When calling this routine, set *RW* to 82 for a read operation or 87 for a write, *SS* to the starting sector number, *SE* to the ending sector number and put the buffer address in *BUFADD*.
380-410	Memory moving routine. Contained in *M$*, this can also be used in your own programs (data in lines 3190-3200). Call with X=USR(ADR(M$), From, To, Length to move.
420-480	Cassette load or save routine. Contained in TL$ (data in lines 3230-3290). Call with X=USR(ADR(TL$), Channel number, Read/write, Address of buffer, Length of buffer. The actual number of bytes loaded is returned in memory locations 203-204.
490-710	Tape load or save routine.
720-1010	Disc file load or save routine.
1020-1240	Disc sector load or save routine.
1250-1400	Memory load or save routine.
1440-1690	Keyboard handler. This is used to replace the standard input routine of the Atari. This routine allows a flashing cursor, numeric only or string input, and waits for a specified number of keys to be pressed. This is called by setting *NUM=1* for numeric input, or 0 for string input. *NP* is the maximum number of keypresses to accept (excluding Backspace), *PN* is the actual number of keys pressed. When the number of keypresses required equals the number actually pressed the routine is exited, likewise if Return is pressed before the maximum number of presses are made the resultant string is found in *A$*.
1700-1920	Hex-decimal-hex convert routine. This will convert any number from 0-65535 ($0000-$FFFF).
1930-1960	GOTO block number routine.
1970-2050	Format disc routine.
2060-2120	Display editor options and state of caps and video or logo keys.
2130-2280	Clear screen and display current block of buffer.
2290-2370	Home cursor and look for Option key and/or keypress and flash cursor.
2380-2550	Check for valid options and GOTO sub-routine accordingly if found.
2560-2710	Accept hex input and modify screen or buffer.
2720-2770	Accept Atascii input and modify screen or buffer.
2780-2950	Main menu.
2960-3370	Initialisation routine.

to another block:

- To move to the next block press Option and N.
- To go back to the previous block press Option and P.
- To go to a specific block, press Option and G.

To convert a number from hex to decimal or vice-versa press Option and C and enter the number to convert. If the number is in hex precede it with a $ sign.

To format a blank disc before saving data press Option and F. Make quite sure that you have removed your program disc before using this option.

To abort the edit, hold down Option and press Esc, which will immediately return you to the main edit menu.

To save the data press Option and S. The save menu will appear, which allows you to save the data to any of the four media options. Make your choice and follow the on-screen prompts. ■

```
1 REM
2 REM  CASSETTE/MEMORY/DISK EDITOR
3 REM  WRITTEN BY
4 REM  AARON SPILLING
5 REM  (AaronFay Marketing Ltd.)
6 REM  FOR ATARI USER MAGAZINE
7 REM  OCTOBER 1986
8 REM
9 REM
10 GRAPHICS 0:CLOSE #6:OPEN #6,12,0,"S
:"
20 GOSUB 2960:GOTO 2790
30 POSITION HT,VT:RETURN
40 POSITION HT,VT:? X$;:RETURN
50 HT=20-INT(LEN(X$)/2):POSITION HT,VT
:? X$;:RETURN
60 POSITION HT,VT:? IS$(1,LL);:RETURN
70 FOR VT=V1 TO V2:POSITION H1,VT:? "█
";:POSITION H2,VT:? "█";:NEXT VT:RETUR
N
80 FOR VT=V1 TO V2:POSITION H1,VT:? "█
";:POSITION H2,VT:? "█";:POSITION H3,V
T:? "█";:NEXT VT:RETURN
90 FOR VT=V1 TO V2:POSITION HT,VT:? SP
$(1,LL);:NEXT VT:RETURN
100 HT=2:V1=20:V2=22:LL=36:GOSUB 90:PO
KE 764,255:RETURN
110 REM OPEN FILE AND READ OR WRITE IT
120 CLOSE #1:OPEN #1,IO,AUX1,F$
130 IF IO=4 THEN LN=BUF:RW=7
140 IF IO=8 THEN RW=11
150 X=USR(ADR(L$),1,RW,BUFADD,LN)
160 IF IO=4 THEN LN=PEEK(40)+256*PEEK(
41)
170 CLOSE #1
180 X1=X
190 RETURN
200 REM GET OR PUT DISK SECTORS
210 REM BY USING DIRECT DISK ACCESS
220 CLOSE #1
230 POKE DUNIT,1
240 RW=87:IF IO=4 THEN RW=82
250 POKE CMD,RW
260 START=BUFADD
270 FOR I=SS TO SE
280 POKE BUFHI,INT(START/256)
290 POKE BUFLO,START-256*PEEK(BUFHI)
300 POKE SECHI,INT(I/256)
310 POKE SECLO,I-256*PEEK(SECHI)
320 X=USR(ADR(CIO$))
330 ST=PEEK(STAT):IF ST<>1 THEN POKE 1
95,ST:GOTO 950
340 START=START+128
350 NEXT I
360 IF IO=4 THEN LN=START-BUFADD
370 RETURN
```

```
380 REM MOVE MEMORY INTO/OUT OF BUFFER
390 IF IO=4 THEN X=USR(ADR(M$),FR,BUFA
DD,LN)
400 IF IO=8 THEN X=USR(ADR(M$),BUFADD,
FR,LN)
410 RETURN
420 REM TAPE LOAD/SAVE
430 OPEN #1,IO,AUX1,F$:RW=7:IF IO=8 TH
EN RW=11
440 IF IO=4 THEN LN=BUF
450 V1=18:V2=20:HT=2:LL=36:GOSUB 90:X$
="READING CASSETTE...":IF IO=8 THEN X$
="WRITING CASSETTE..."
460 VT=19:GOSUB 50:X=USR(ADR(TL$),1,RW
,BUFADD,LN)
470 CLOSE #1
480 RETURN
490 F$="C:"
500 IF IO=4 THEN X$="LOAD FROM CASSETT
E":VT=14:GOSUB 50:GOTO 520
510 X$="SAVE TO CASSETTE":VT=14:GOSUB
50
520 AUX1=128
530 V1=16:V2=21:HT=2:LL=36:GOSUB 90
540 X$="PRESS PLAY ON CASSETTE UNIT":V
T=16:IF IO=8 THEN X$="PRESS PLAY & REC
ORD ON CASSETTE UNIT"
550 GOSUB 50:VT=18:X$="PRESS START TO
CONTINUE":GOSUB 50:VT=19:X$="OR OPTION
 TO ABORT":GOSUB 50
560 X=PEEK(53279):IF X<>3 AND X<>6 THE
N 560
570 IF X=3 AND IO=8 THEN 2140
580 IF X=3 AND IO=4 THEN 2790
590 IF X=6 THEN POKE 764,12:GOSUB 430
600 IF IO=8 THEN 2140
610 IF X<>136 THEN 640
620 LN=PEEK(203)+256*PEEK(204)
630 GOTO 2140
640 V1=16:V2=21:HT=2:LL=36:GOSUB 90
650 IF X=1 THEN X$="FILE TOO LARGE FOR
 BUFFER":VT=18:GOSUB 50:GOTO 670
660 X$="I/O ERROR, CHECK CONNECTIONS":
VT=18:GOSUB 50
670 VT=19:X$="PRESS START TO TRY AGAIN
":GOSUB 50:X$="OR OPTION TO ABORT":VT=
20:GOSUB 50
680 X=PEEK(53279):IF X<>3 AND X<>6 THE
N 680
690 IF X=3 AND IO=8 THEN 2140
700 IF X=3 AND IO=4 THEN 2790
710 GOTO 490
720 VT=14:IF IO=4 THEN X$="LOAD FROM D
ISK FILE":GOSUB 50:GOTO 740
730 X$="SAVE TO DISK FILE":GOSUB 50
740 X$="Enter Filename >":HT=5:VT=17:G
OSUB 40
750 HT=21:NUM=0:NP=14
760 GOSUB 1450:F$=A$
770 IF A$(1,2)="D:" THEN F$=A$:GOTO 79
0
780 F$="D:":F$(LEN(F$)+1)=A$
790 AUX1=0
800 HT=2:LL=36:V1=17:V2=17:GOSUB 90
810 X$="PRESS START TO CONTINUE":VT=19
:GOSUB 50:X$="OR OPTION TO ABORT":VT=2
0:GOSUB 50
820 X=PEEK(53279):IF X<>3 AND X<>6 THE
N 820
830 IF X=3 AND IO=4 THEN 2790
840 IF X=3 AND IO=8 THEN 2140
850 HT=2:LL=36:V1=19:V2=20:GOSUB 90:X$
="LOADING...":IF IO=8 THEN X$="WRITING
..."
860 VT=19:GOSUB 50
870 TRAP 950:GOSUB 110
880 IF X1=LN AND IO=4 THEN 940
890 HT=2:LL=36:V1=17:V2=21:GOSUB 90
900 ? "[illegible]";:X$="MEMORY FULL, INCOMPLET
E LOAD":VT=19:GOSUB 50:VT=20:X$="PRESS
 START TO CONTINUE":VT=20:GOSUB 50
910 VT=21:X$="OR OPTION TO ABORT":GOSU
B 50
920 X=PEEK(53279):IF X<>3 AND X<>6 THE
N 920
930 IF X=3 THEN 2790
940 GOTO 2140
950 Y=PEEK(195):IF Y=144 AND IO=8 THEN
 X$="UNABLE TO WRITE TO DISK":GOTO 990
960 IF Y=144 AND IO=4 THEN X$="UNABLE
TO READ DISK":GOTO 990
970 IF Y=130 THEN X$="DEVICE NOT PRESE
NT":GOTO 990
980 IF Y=162 THEN X$="DISK FULL":GOTO
990
985 X$="I/O ERROR"
990 HT=2:V1=17:V2=21:LL=36:GOSUB 90:VT
=18:GOSUB 50:X$="A B O R T I N G  O P
E R A T I O N":VT=20:GOSUB 50
1000 FOR I=1 TO 999:NEXT I:CLOSE #1
1010 GOTO 2790
1020 VT=14:IF IO=4 THEN X$="LOAD DISK
SECTORS":GOSUB 50:GOTO 1040
1030 X$="SAVE DISK SECTORS":GOSUB 50
1040 REM
1050 REM
1060 REM
1070 MS=1040
1080 V1=16:V2=19:HT=2:GOSUB 90
1090 X$="Enter Start Sector >":HT=5:VT
=17:GOSUB 40
1100 HT=25:NUM=1:NM=48:MN=57:NP=4:GOSU
B 1450:SS=VAL(A$)
1110 IF IO=8 THEN 1170
1120 IF SS<1 OR SS>MS THEN V1=17:V2=V1
:HT=2:GOSUB 90:GOTO 1090
1130 X$="Enter End   Sector >":HT=5:VT
=18:GOSUB 40
1140 HT=25:NUM=1:NM=48:MN=57:NP=4:GOSU
B 1450:SE=VAL(A$)
1150 IF SE<SS OR SE>MS THEN V1=18:V2=V
1:HT=2:GOSUB 90:GOTO 1130
1160 IF SE-SS>MAXSEC THEN V1=17:V2=18:
HT=2:LL=36:GOSUB 90:GOTO 1090
1170 V1=16:V2=21:HT=2:LL=36:GOSUB 90
1180 VT=18:X$="PRESS START TO CONTINUE
":GOSUB 50:VT=19:X$="OR OPTION TO ABOR
T":GOSUB 50
1190 X=PEEK(53279):IF X<>3 AND X<>6 TH
EN 1190
1200 IF X=3 AND IO=8 THEN 2140
1210 IF X=3 AND IO=4 THEN 2790
1220 IF IO=8 THEN SE=SS+BL
1230 GOSUB 200
1240 GOTO 2140
1250 VT=14:IF IO=4 THEN X$="LOAD FROM
MEMORY":GOSUB 50:GOTO 1270
1260 X$="SAVE TO MEMORY":GOSUB 50
1270 X$="Enter Start Address >":VT=16:
HT=5:GOSUB 40
1280 HT=26:NUM=1:NM=48:MN=57:NP=5:GOSU
B 1450:FR=VAL(A$)
1290 IF FR<0 OR FR>65535 THEN V1=16:V2
=V1:HT=2:GOSUB 90:GOTO 1270
1300 IF IO=8 THEN 1340
1310 X$="Number Of Bytes To Move >":HT
=5:VT=17:GOSUB 40
1320 HT=30:NUM=1:NM=48:MN=57:NP=5:GOSU
B 1450:LN=VAL(A$)
1330 IF FR+LN>65535 OR LN>BUF THEN V1=
17:V2=V1:HT=2:GOSUB 90:GOTO 1310
1340 V1=16:V2=19:HT=2:LL=36:GOSUB 90
1350 X$="PRESS START TO CONTINUE":VT=1
7:GOSUB 50:X$="OR OPTION TO ABORT":VT=
18:GOSUB 50
1360 X=PEEK(53279):IF X<>3 AND X<>6 TH
EN 1360
1370 IF X=3 AND IO=4 THEN 2790
1380 IF X=3 AND IO=8 THEN 2140
1390 GOSUB 380
1400 GOTO 2140
1410 ? "}"
1420 POKE 752,0
1430 END
1440 REM KEYBOARD HANDLER
1450 CLOSE #5:OPEN #5,4,0,"K:"
1460 PN=0:A$=" ":A$(NP)=" ":A$(2)=A$:P
OSITION HT,VT:? A$;
1470 IF PN=NP THEN 1690
1480 POSITION HT,VT:? A$;:POSITION HT+
PN,VT:? "+";:FOR I=1 TO 19:IF PEEK(764
)<>255 THEN I=20
1490 POKE 77,0
1500 NEXT I:IF PEEK(764)<>255 THEN 153
0
1510 POSITION HT+PN,VT:? "[illegible]";:FOR I=1
TO 20:IF PEEK(764)<>255 THEN I=20
1520 NEXT I:IF PEEK(764)=255 THEN 1470
1530 POSITION HT+PN,VT:? " ";
1540 GET #5,K:IF K=155 THEN 1680
1550 IF K=125 THEN 1460
1560 IF K=126 THEN 1650
1570 IF K<32 OR K>124 THEN FOR I=1 TO
29:POKE 53279,0:NEXT I:GOTO 1470
1580 IF NUM=1 THEN IF K<NM OR K>MN OR
K=47 THEN FOR I=1 TO 9:POKE 53279,0:NE
XT I:GOTO 1470
1590 POSITION HT+PN,VT:? CHR$(K);
1600 PN=PN+1
1610 A$(PN,PN)=CHR$(K)
1620 POSITION HT,VT:? A$;:GOTO 1470
1630 GET #5,K:IF K<>155 AND K<>126 THE
N FOR I=1 TO 9:POKE 53279,0:NEXT I:GOT
O 1630
1640 IF K=155 THEN 1680
1650 IF PN>0 THEN A$(PN,PN)=" ":PN=PN-
1
1660 IF PN=0 THEN 1470
```

```
1670 GOTO 1620
1680 IF PN=0 THEN FOR I=0 TO 9:POKE 53
279,0:NEXT I:GOTO 1460
1690 CLOSE #5:RETURN
1700 GOSUB 100:X$="Enter No. To Conver
t >":HT=10:VT=20:GOSUB 40:X$="Precede
No. With $ For Hex->Dec":VT=21:GOSUB 5
0
1710 VT=20:HT=32:NP=5:NUM=0:GOSUB 1450
1720 IF A$(1,1)="$" THEN 1800
1730 FOR L=1 TO LEN(A$):IF ASC(A$(L,L)
)<48 OR ASC(A$(L,L))>57 AND ASC(A$(L,L
))<>32 THEN L=5:NEXT L:GOTO 1700
1740 A=VAL(A$):H=INT(A/256):L=A-256*H
1750 A=INT(H/16):B=H-16*A:A$=H$(A+1,A+
1):A$(LEN(A$)+1)=H$(B+1,B+1)
1760 A=INT(L/16):B=L-16*A:A$(LEN(A$)+1
)=H$(A+1,A+1):A$(LEN(A$)+1)=H$(B+1,B+1
)
1770 GOSUB 100
1780 VT=20:X$="HEX EQUIVALENT IS :$":H
T=9:GOSUB 40:HT=29
1790 GOTO 1890
1800 A$=A$(2)
1810 N=0:FOR I=1 TO LEN(A$):IF A$(I,I)
<"0" AND A$(I,I)<>" " THEN 1880
1820 IF A$(I,I)=" " THEN 1860
1830 IF A$(I,I)<="9" THEN 1850
1840 IF A$(I,I)<"A" OR A$(I,I)>"F" THE
N 1880
1850 N=N*16+ASC(A$(I))-48-7*(ASC(A$(I)
)>64)
1860 NEXT I
1870 GOSUB 100:VT=20:X$="DEC EQUIVALEN
T IS :":HT=9:GOSUB 40:HT=28:A$=STR$(N)
:GOTO 1890
1880 A$="INVALID HEX NUMBER, TRY AGAIN
":GOSUB 100:VT=20:HT=5
1890 X$=A$:GOSUB 40:VT=21:X$="PRESS ST
ART FOR ANOTHER":GOSUB 50:X$="OR OPTIO
N FOR EDITOR":VT=22:GOSUB 50
1900 L=PEEK(53279):IF L<>6 AND L<>3 TH
EN 1900
1910 IF L=3 THEN GOSUB 100:GOSUB 2060:
RETURN
1920 GOTO 1700
1930 REM GOTO BLOCK NO. ROUTINE
1940 GOSUB 100:VT=21:X$="Goto Block No
. :":HT=10:GOSUB 40
1950 NUM=1:NM=48:MM=57:NP=3:HT=26:GOSU
B 1450:A=VAL(A$)-1:IF A<0 OR A>BL-1 TH
EN 1940
1960 START=A:RETURN
1970 REM FORMAT DISK
1980 GOSUB 100:VT=20:X$="Format Disk":
GOSUB 50
1990 X$="PRESS START TO CONTINUE":VT=2
1:GOSUB 50:X$="OR OPTION TO ABORT":VT=
22:GOSUB 50
2000 L=PEEK(53279):IF L<>3 AND L<>6 TH
EN 2000
2010 IF L=3 THEN GOSUB 100:GOSUB 2060:
RETURN
2020 GOSUB 100:X$="FORMATTING DISK...P
LEASE WAIT":VT=21:GOSUB 50
2030 CLOSE #1:XIO 254,#1,0,0,"D:*.*":C
LOSE #1
2040 GOSUB 100:GOSUB 2060
2050 RETURN
2060 GOSUB 100:X$="OPTION+ NEXT,PREV,S
AVE,GOTO,ESC-EXIT":VT=20:GOSUB 50
2070 X$="CONVERT HEX/DEC, FORMAT DISK"
:HT=10:VT=21:GOSUB 40
2080 VT=22:X$="MODE: ATASCII":IF  NOT
CH THEN X$="MODE: HEX"
2090 HT=2:GOSUB 40:HT=16:X$="CAPS:ON":
IF  NOT PEEK(702) THEN X$(6)="OFF"
2100 GOSUB 40:HT=25:X$="VIDEO:NORMAL":
IF PEEK(694) THEN X$(7)="REVERSE"
2110 GOSUB 40
2120 RETURN
2130 REM EDITING SUBROUTINE
2140 POKE 752,1
2150 ? "K":VT=0:HT=1:LL=38:GOSUB 60:V1
=1:V2=22:H1=1:H2=38:GOSUB 70:HT=1:VT=2
3:GOSUB 60
2160 POKE 764,255
2170 BL=INT(LN/128)+1*(LN/128<>INT(LN/
128))
```



```
2180 IF START>BL-1 THEN START=0
2190 IF START<0 THEN START=BL-1
2200 X$="EDITING BLOCK ":X$(LEN(X$)+1)
=STR$(START+1):X$(LEN(X$)+1)=" OF "
2210 X$(LEN(X$)+1)=STR$(BL)
2220 VT=1:GOSUB 50
2230 HT=1:VT=2:GOSUB 60:H1=29:H2=29:V1
=3:V2=18:GOSUB 70:VT=19:HT=1:GOSUB 60
2240 HT=2:FOR I=1 TO 16:VT=2+I:POSITIO
N HT,VT:? H1$(I*2-1,I*2);"█";:NEXT I
2250 FOR I=0 TO 127:A=PEEK(BUFADD+(STA
RT*128)+I):VT=3+INT(I/8):J=(I-(INT(I/8
)*8)):HT=5+3*J+1*(J>3)
2260 POSITION HT,VT:? HX$(A*2+1,A*2+2)
;:HT=30+J:POSITION HT,VT:? "€";CH$(A+1
,A+1);
2270 NEXT I
2280 GOSUB 2060:POKE 1789,0
2290 IH=0:JH=0
2300 HT=5+3*JH+1*(JH>3)+PEEK(1789):VT=
3+IH:POSITION HT,VT:LOCATE HT,VT,A:B=B
UFADD+(START*128)+(IH*8)+JH
2310 A=A+128*(A<128)-128*(A>127)
2320 POSITION HT,VT:? CHR$(A);
2330 REM SCAN KEYBOARD AND LOOK FOR OP
TION
2340 K=PEEK(764):K1=PEEK(53279)
2350 LOCATE HT,VT,A:A=A+128*(A<128)-12
8*(A>127):POSITION HT,VT:? CHR$(A);
2360 IF K=255 THEN 2300
2370 IF K1<>3 THEN 2510
2380 REM OPTION PRESSED, CHECK FUNCTIO
N
2390 IF K=28 THEN RT=1:IO=4:GOTO 2790:
REM ABORT
2400 IF K=61 THEN GOSUB 1940:GOTO 2140
:REM GOTO BLOCK NO.
2410 IF K=56 THEN GOSUB 1980:GOTO 2760
:REM FORMAT DISK
2420 IF K=37 THEN CH=1-CH:GOSUB 2060:G
OTO 2760:REM HEX/ATASCII TOGGLE
2430 IF K=35 THEN START=START+1:GOTO 2
150:REM NEXT BLOCK
2440 IF K=10 THEN START=START-1:GOTO 2
150:REM PREVIOUS BLOCK
2450 IF K=18 THEN GOSUB 1700:GOTO 2760
:REM CONVERT HEX/DEC
2460 IF K=62 THEN IO=8:GOTO 2790:REM S
AVE WORK
2470 IF K=14 THEN IH=IH-1:IF IH<0 THEN
 IH=15:GOTO 2760:REM MOVE CURSOR UP
2480 IF K=15 THEN IH=IH+1:IF IH>15 THE
N IH=0:GOTO 2760:REM MOVE CURSOR DOWN
2490 IF K=6 THEN JH=JH-1:IF JH<0 THEN
JH=7:GOTO 2760:REM MOVE CURSOR RIGHT
2500 IF K=7 THEN JH=JH+1:IF JH>7 THEN
JH=0:GOTO 2760:REM MOVE CURSOR LEFT
2510 IF K=60 THEN X=PEEK(702):IF X=64
THEN POKE 702,0:GOSUB 2060:GOTO 2760
2520 IF K=60 THEN IF X=0 THEN POKE 702
,64:GOSUB 2060:GOTO 2760
2530 IF K=39 THEN X=PEEK(694):IF X=0 T
HEN POKE 694,128:GOSUB 2060:GOTO 2760
2540 IF K=39 THEN IF X=128 THEN POKE 6
94,0:GOSUB 2060:GOTO 2760
2550 IF K1=3 THEN 2760
2560 IF CH THEN 2720
2570 POKE 1790,PEEK(694):POKE 1791,PEE
K(702)
2580 POKE 694,0:POKE 702,64
2590 CLOSE #5:OPEN #5,4,0,"K:":GET #5,
K:CLOSE #5
2600 IF (K<48 OR K>57) AND (K<65 OR K>
70) THEN 2700
2610 B1=PEEK(B):B2=INT(B1/16):B3=B1-16
*B2
2620 K=K-48:IF K>9 THEN K=K-7
2630 IF  NOT PEEK(1789) THEN B2=K
2640 IF PEEK(1789) THEN B3=K
2650 POKE 1789,1-PEEK(1789)
2660 B1=B2*16+B3:POKE B,B1
2670 HT=5+3*JH+1*(JH>3):VT=3+IH:POSITI
ON HT,VT:? HX$(B1*2+1,B1*2+2);:HT=30+J
H:POSITION HT,VT:? CH$(B1+1,B1+1);
2680 IF PEEK(1789) THEN 2700
2690 JH=JH+1:IF JH>7 THEN JH=0:IH=IH+1
:IF IH>15 THEN IH=0
2700 POKE 694,PEEK(1790):POKE 702,PEEK
(1791)
2710 GOTO 2760
2720 CLOSE #5:OPEN #5,4,0,"K:":GET #5,
K:CLOSE #5
2730 VT=3+IH:POSITION 30+JH,VT:? CH$(K
+1,K+1);:HT=5+3*JH+1*(JH>3):POSITION H
T,VT:? HX$(K*2+1,K*2+2);
2740 POKE B,K
2750 JH=JH+1:IF JH>7 THEN JH=0:IH=IH+1
```

```
:IF IN>15 THEN IN=0
2760 IF K<255 THEN POKE 764,255
2770 GOTO 2300
2780 REM MAIN MENU
2790 IF RT THEN ? "K":GOSUB 3000:RT=0
2800 POKE 694,0:POKE 702,64
2810 V1=15:V2=V1:HT=2:LL=36:GOSUB 90:V
T=12:GOSUB 60
2820 POKE 764,255
2830 X$="1 Cassette File":HT=13:VT=14:
GOSUB 40
2840 X$="2 Disk Sectors":VT=15:GOSUB 4
0
2850 X$="3 File On Disk":VT=16:GOSUB 4
0
2860 X$="4 Memory":VT=17:GOSUB 40
2870 X$="5 Quit":VT=18:IF IO=8 THEN X$
="5 Abort Save"
2880 GOSUB 40:HT=15:X$="Edit Which ?":
VT=20
2890 IF IO=8 THEN X$="Save Which ?"
2900 GOSUB 40
2910 HT=27:NP=1:NUM=1:NM=49:MM=53:GOSU
B 1450:K=VAL(A$)
2915 IF K=5 AND IO=8 THEN 2140
2920 IF K=5 THEN 2950
2930 V1=13:V2=21:HT=2:LL=36:GOSUB 90
2940 RT=1:OP=K
2950 ON K GOTO 490,1020,720,1250,1410
2960 DIM X$(40),IS$(40),SP$(40),L$(43)
,CIO$(5),F$(15),M$(39),A$(40),H$(16),H
1$(32),HX$(512),CH$(256),TL$(52)
2970 IS$(1)="█":IS$(40)="█":IS$(2)=IS$
2980 SP$(1)=" ":SP$(40)=" ":SP$(2)=SP$
2990 POKE 710,192:POKE 712,192:POKE 75
2,1:POKE 82,0
3000 HT=1:LL=38:FOR VT=1 TO 3:GOSUB 60
:NEXT VT
3010 V1=2:V2=21:H1=1:H2=38:GOSUB 70
3020 VT=22:HT=1:LL=38:GOSUB 60
3030 X$="CASSETTE/DISK/MEMORY EDITOR":
VT=2:GOSUB 50
3040 X$="Written By":VT=5:GOSUB 50
3050 X$="AaronFay Marketing Ltd.":VT=8
:GOSUB 50
3060 X$="Aaron Spilling":VT=7:GOSUB 50
3070 X$="for ATARI USER":VT=10:GOSUB 5
0
3080 IF RT THEN RETURN
3090 X$="PLEASE WAIT...":VT=15:GOSUB 5
0
3100 BT=PEEK(144)+256*PEEK(145)
3110 OT=PEEK(741)+256*PEEK(742)
3120 BUFADD=BT+500:BUF=OT-BUFADD
3130 FOR I=1 TO 43:READ A:L$(I)=CHR$(A
):NEXT I
3140 FOR I=1 TO 5:READ A:CIO$(I)=CHR$(
A):NEXT I
3150 DATA 104,104,104,10,10,10,10,170,
104,104,157,66,3,104,157,69,3,104,157,
68,3,104,157,73,3,104,157
3160 DATA 72,3,32,86,228,189,72,3,133,
212,189,73,3,133,213,96
3170 DATA 104,32,83,228,96
3180 FOR I=1 TO 39:READ A:M$(I)=CHR$(A
):NEXT I
3190 DATA 104,104,133,215,104,133,214,
104,133,217,104,133,216,104,133,218,10
4,170,160,0,177,214,145,216
3200 DATA 200,208,4,230,215,230,217,20
2,208,242,198,218,16,238,96
3210 CMD=770:STAT=771:BUFLO=772:BUFHI=
773:DUNIT=769:SECLO=778:SECHI=779:MAXS
EC=INT(BUF/128)+1
3220 FOR I=1 TO 52:READ A:TL$(I,I)=CHR
$(A):NEXT I
3230 DATA 32,68,218,104,201,4,208,43
3240 DATA 104,104,10,10,10,10,170,104
3250 DATA 104,157,66,3,104,157,69,3
3260 DATA 104,157,68,3,104,157,73,3
3270 DATA 104,157,72,3,32,86,228,132
3280 DATA 212,189,72,3,133,203,189,73
3290 DATA 3,133,204,96
3300 H1$="0008101820283038404850586068
7078":H$="0123456789ABCDEF"
3310 FOR I=1 TO 256:J=INT((I-1)/16):K=
I-J*16:J=J+1:L=LEN(HX$)+1:HX$(L,L)=H$(
J,J):HX$(L+1,L+1)=H$(K,K):CH$(I,I)=CHR
$(I-1)
3320 X$=" "
3330 X$(LEN(X$)+1)=STR$(256-I):X$(LEN(
X$)+1)=" ":VT=16:GOSUB 50
3340 IF I=155 THEN CH$(I,I)=CHR$(27)
3350 NEXT I
3360 IO=4
3370 RETURN
```



Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	14471	2	17724	3	15646
4	16301	5	19112	6	17122
7	15595	8	14471	9	871
10	6518	20	3905	30	4725
40	5741	50	9901	60	7226
70	15467	80	19934	90	11801
100	9696	110	18208	120	5037
130	4828	140	3332	150	5767
160	6433	170	1559	180	1039
190	1498	200	14128	210	16311
220	1559	230	2493	240	4413
250	2219	260	2619	270	2848
280	5224	290	6463	300	4147
310	5505	320	3197	330	9454
340	3117	350	1345	360	5598
370	1498	380	18745	390	7845
400	7746	410	1498	420	8564
430	8109	440	3826	450	18007
460	8967	470	1559	480	1498
490	979	500	18669	510	12718
520	1547	530	5811	540	23691
550	22049	560	7224	570	4638
580	4683	590	6158	600	2917
610	3331	620	4464	630	1869
640	5811	650	12961	660	9293
670	20504	680	7235	690	4638
700	4683	710	1641	720	18170
730	11706	740	9060	750	3404
760	2878	770	6022	780	3993
790	1171	800	5703	810	20361
820	7217	830	4683	840	4638
850	14161	860	2827	870	3510
880	4655	890	5687	900	24080
910	10063	920	7220	930	2860
940	1869	950	13551	960	10247
970	8458	980	6473	985	2588
990	31178	1000	5611	1010	1907
1020	17668	1030	11867	1040	871
1050	871	1060	871	1070	1220
1080	4744	1090	10265	1100	9669
1110	2918	1120	10789	1130	9739
1140	9627	1150	11056	1160	11905
1170	5811	1180	20424	1190	7285
1200	4638	1210	4683	1220	3990
1230	1880	1240	1869	1250	17595
1260	10430	1270	10406	1280	9645
1290	11242	1300	2914	1310	10992
1320	9644	1330	12406	1340	5826
1350	20380	1360	7278	1370	4683
1380	4638	1390	1915	1400	1869
1410	1049	1420	1843	1430	836
1440	9975	1450	4346	1460	8993
1470	3257	1480	16150	1490	1797
1500	6562	1510	12349	1520	6045
1530	4786	1540	4643	1550	2986
1560	2991	1570	11769	1580	15704
1590	5598	1600	1381	1610	2985
1620	5866	1630	13702	1640	3005

1650	6232	1660	2931	1670	1874
1680	10069	1690	3229	1700	24164
1710	6444	1720	3916	1730	18178
1740	5619	1750	9730	1760	11442
1770	1877	1780	9971	1790	1908
1800	1269	1810	10761	1820	4116
1830	4291	1840	6736	1850	6048
1860	1345	1870	15214	1880	10469
1890	23697	1900	7167	1910	7685
1920	1869	1930	13171	1940	10870
1950	14182	1960	3405	1970	7080
1980	12647	1990	20333	2000	7131
2010	7685	2020	22504	2030	6534
2040	3861	2050	1498	2060	18744
2070	10932	2080	10918	2090	12132
2100	12501	2110	1646	2120	1498
2130	11260	2140	1844	2150	15478
2160	2121	2170	6834	2180	5004
2190	5296	2200	11798	2210	3658
2220	2620	2230	13292	2240	12879
2250	16354	2260	14058	2270	1345
2280	4074	2290	1784	2300	18578
2310	4168	2320	4907	2330	19665
2340	4704	2350	12473	2360	2978
2370	3012	2380	18804	2390	9785
2400	14543	2410	13850	2420	19764
2430	14009	2440	16699	2450	15754
2460	11195	2470	17756	2480	19282
2490	20243	2500	19212	2510	12771
2520	10329	2530	13020	2540	10453
2550	2892	2560	2682	2570	7260
2580	3956	2590	7784	2600	7590
2610	6214	2620	4410	2630	4747
2640	3973	2650	3923	2660	3611
2670	18740	2680	3818	2690	9738
2700	6927	2710	1895	2720	7784
2730	17330	2740	1670	2750	9738
2760	4292	2770	1859	2780	5758
2790	5748	2800	3956	2810	8754
2820	2121	2830	9135	2840	7517
2850	7084	2860	5734	2870	9951
2880	7780	2890	6263	2900	1646
2910	9558	2915	4577	2920	2805
2930	5808	2940	2012	2950	5230
2960	15623	2970	5992	2980	5183
2990	8132	3000	7925	3010	5405
3020	4888	3030	19203	3040	6617
3050	9498	3060	7725	3070	6561
3080	3654	3090	11500	3100	4480
3110	4551	3120	5422	3130	7256
3140	7605	3150	14303	3160	8586
3170	3391	3180	7280	3190	14688
3200	9128	3210	17119	3220	7982
3230	4853	3240	4876	3250	4757
3260	4738	3270	4851	3280	5045
3290	2802	3300	21763	3310	20276
3320	928	3330	10014	3340	5105
3350	1345	3360	919	3370	1498



Birthday tips for Level 9

By Brillig

LEVEL 9 Software, which celebrates its fifth birthday this year, has provided much pleasure to untold numbers of adventurers. Happy Birthday to the team and long may they continue.

By way of a small tribute here is a collection of tips for three Level 9 adventures, including the very latest, The Price of Magik.

We're also featuring hints from two of Infocom's Enchanter trilogy. As any Infocom's afficianado will know, the standard punishment for wandering in the dark without benefit of lamp or other source of light is to be pounced on by a grue and immediately done to death.

Not all of Infocom's adventures star these feared (yet strangely welcome) denizens of the dark, but even so they do seem to crop up fairly regularly, I'm pleased to say.

In Brian Moriarty's new adventure, Trinity, reviewed in this month's issue of *Atari ST User*, the mere mention of a grue meets with a sigh as a response. Although grues fail to put in an appearance in this one, their omission is more than made up for by the inclusion of one of the most fearsome-looking Barrow Wights it's ever been my misfortune to meet up with.

Go and get Trinity – it's marvellous. And be sure to visit the one-eyed cutie.

Finally what do you think about seeing direct, but simply coded, solutions to problems in *Atari User?* Would you rather they weren't coded at all? Or perhaps, like some adventurers, you might prefer not to be given solutions, but instead would rather have cryptic clues so that some of the brainwork is still left up to you.

I'm sure you've got strong views on the subject, so why not write in and let me hear them? ■

GLITCHES OF THE MONTH

This month two illustrious adventure companies to have their glitches revealed for all to see.

Firstly, in Infocom's Trinity, you'll eventually find yourself standing by a Waterfall. If you then type GET WET, you'll receive the Daliesque response: "You're already holding the handful of honey".

Secondly, when you're in front of the guru's hut in Rainbird's The Pawn say CLIMB THE HUT: You won't end up on the roof as hoped but merely inside the hut – it must be open-topped.

HINTS 'N' TIPS

LORDS OF TIME

Having problems in the amphitheatre? To deal with the lion:
NOIL EHTT ATEN EHTW ORHT TNED IRTE HTWO RHT

To elude the gladiator:
SLAD NASD EGNI WEHT RAEW

Can't pass the invention room?
HTUO SOGN EHTA KERU ETUO HS

THE PRICE OF MAGIK

Want to help the ghost and get the plate armour?
TPYR CEHT NISE NOBD NALL UKSE NOBE LKCU NKEH TYRU B

Can't see in the dark?
NEDR AGBR EHEH TMOR FTHG IRBE YEEH TTEG SEYE NITH GIRB EYEB UR

What use is the wargame on the large table near the roof garden?
KCIG AMHT IWTI EKAW UOYF ILLE PSAN RAEL LLIW UOY

RED MOON

To carry the sword from the forge:
SEVO LGRE HTAE LEHT RAEW

→

Problems in the metal room?
STOO BNOT GNIL LEWE HTRA EW

SORCERER

This adventure features, for the first time, an actual grue's lair. However, these are no ordinary grues but mutations – they aren't scared of lights.

So just how do you manage to get by them, for get by them you must?
TIKN OITC ETOR PCIG AMZZ OBOR FEHT DEEN UOY NOOGA LEHT FORO OLFE HTNO SITI
GNIH TYRE VEPR ODUO YFID EVOM EBYL NONA CETA RCEH T
DERI TTON ERAU OYSA GNOL SADN A
EFAS OUYP EEKL LIWT IUSE URGE HTGN IRAE W TNEL LEPE REHT HTIW FLES RUOY GNIY YARP SRO HGUO HTYL TFIW SFFO SRAE WTNE LLEP EREH T

When you meet a grue in the dark in this adventure, and in Spellbreaker, have you ever seen what happens when you attempt to FROTZ GRUE?

SPELLBREAKER

In this final and toughest part of the excellent Enchanter trilogy, there's a grue cave which is simply teeming with the nasty brutes. There's only one way to survive this gruesome experience.



EVAC EURG EHTO TNIT HGIL YNAY RRAC TONO D ENOO TNIN RUTL LIWU OYDN AEUR GAG IVAN S

As soon as you've completed the above, perhaps for fun you might like to try the following. They won't help you to escape but they're a giggle!

REVA LS
EURG AKCA TTA
EURG A TA KOOL

Lastly, when you first enter the cave, have a go at YOMINing a grue.

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Mercenary was a smash hit when it was released last year. Now Novagen have produced a new dataset to load into Mercenary. The Second City is crammed with even greater challenges, and has moved our independent reviewer to describe it as: *"A classic game . . . a heady mix of flight simulation, strategy and arcade action using incredibly fast 3D vector graphics".*

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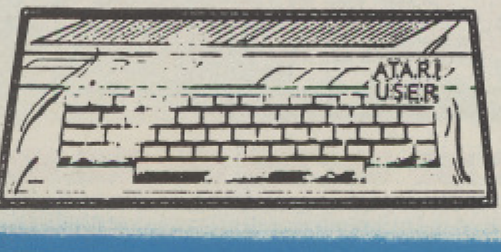
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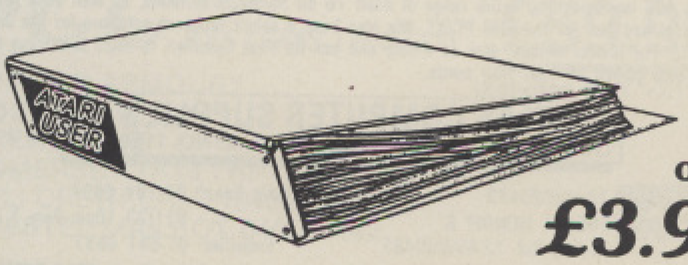
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ST	✓



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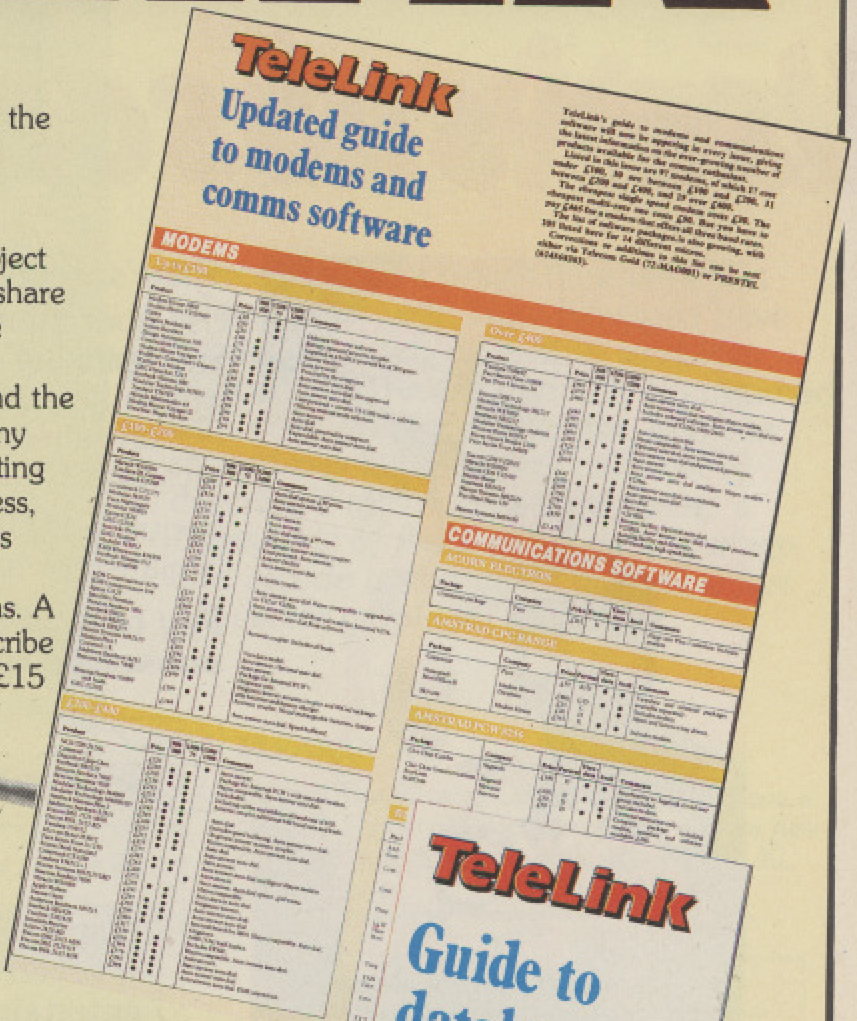
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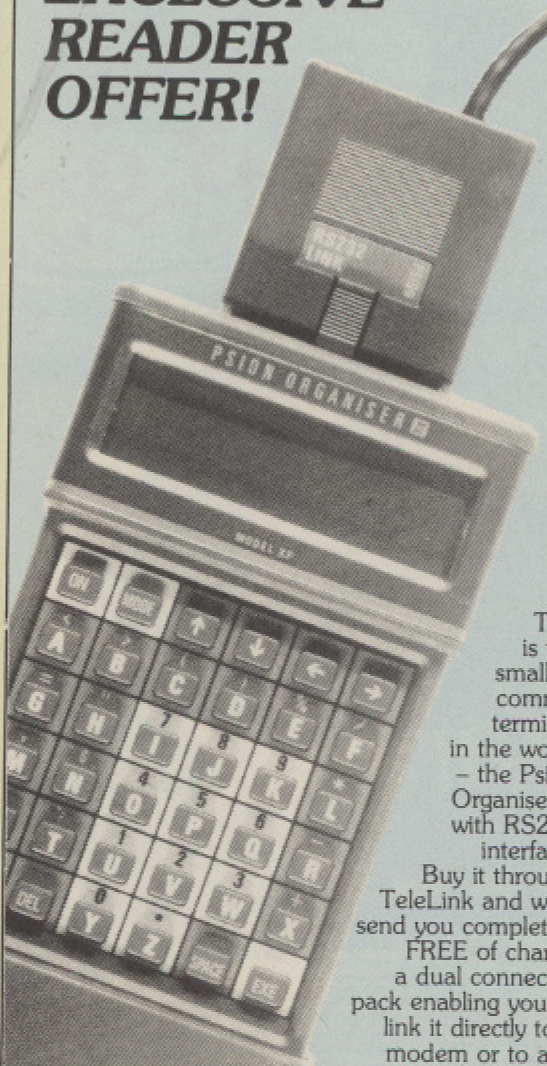


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MicroLink in association with TELECOM GOLD
No. 14 October 1986

NEWSLETTER

Helping relieve famine

MICROLINK was used to keep track of progress in a nationwide computer game marathon which raised more than £5,000 for Ethiopian famine relief.

The event involved micro owners all over the country playing the cult role-playing adventure Dungeons and Dragons.

Two teams of nine took part in a stamina-sapping Draganothon at the Trafalgar Square Community Centre in London and wrote themselves into the Guinness Book of Records after 84 continuous hours.

Other major Dragon Aid events were held simultaneously at Aberdeen and Basingstoke, and hundreds of mini marathons took place in family living rooms throughout Britain.

Organiser Adrian Mars said the on-line adventurers raised at least half of the £5,000 which will go to Bob Geldorf's Band Aid Trust.

RADIO FANS ARE TUNING IN TO MICROLINK

WHILE its 38,000 members communicate with one another across the ether, the Radio Society of Great Britain has been conducting its business closer to the ground via telephone, snail mail and traditional telex.

But all that is changing thanks to the society's group of mailboxes on MicroLink.

Chief excecutive David Evans says: "We are using MicroLink as a means of exchanging information between myself and a large number of members in the field who serve on our 16 committees, and other individuals both nationally and internationally.

"Being a commercial organisation, by law we cannot use the airwaves to conduct our business as the national organisation for radio amateurs in the UK.

"We represent the licensed amateur at government level and also publish books, magazines and technical material under 25 different titles.

"A remarkable two-thirds of our members are micro owners and we hope MicroLink will eventually be used for much of our committee work and the transmission of material for our publications, taking the place of ordinary telex and, to a certain extent, the telephone".

Sales link

WHEN MicroLink subscriber John Heritage heard that friends of his were having difficulty selling their house he came up with a bright idea.

Why not advertise the £84,950 det. des. res. in Fleet, Hampshire, on MicroLink's bulletin board? He duly did and within a few hours recorded more than 20 responses from other subscribers intrigued by the special offer of "at least three per cent discount" for MicroLink members.

But before the offers started rolling in the property was sold through normal channels.

Sunny solution

OUT on the sunny Costa Blanca, David Corcoran is spreading the word about MicroLink to Spanish-based business people and fellow expatriates.

Corcoran, whose background is in insurance, believes there's a real need for fast reliable communications among a community that has strong ties with other countries, particularly the UK. He has been living in Alicante for 18 months, setting up a company providing computers, modems, acoustic couplers and comms software to Spanish residents with links abroad.

He has made MicroLink his choice as the recommended communications system for his clients, setting a target of 500 new mailboxes in the first year.

ATARI ST

STRIP POKER



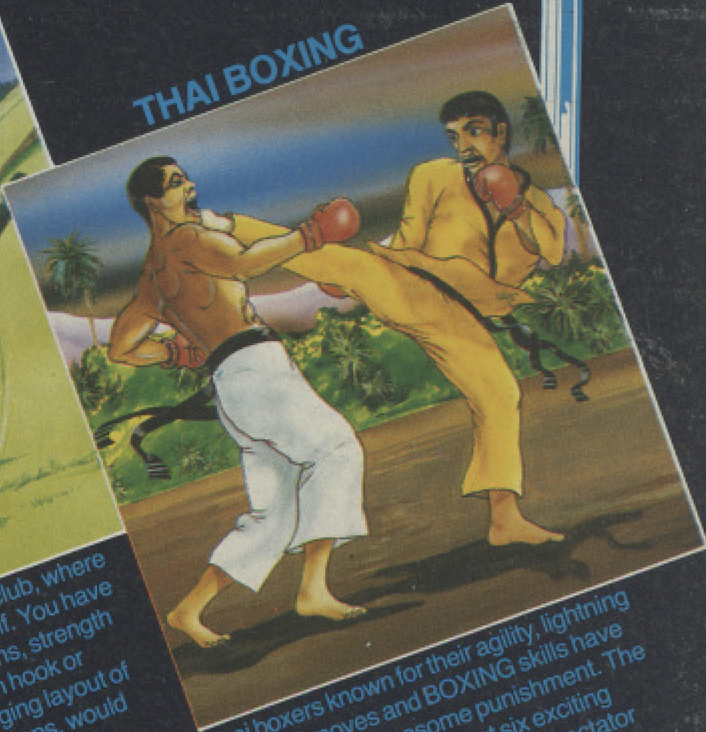
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